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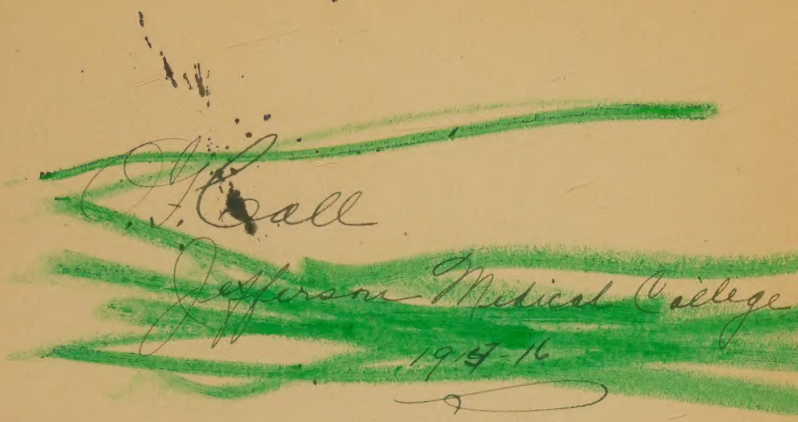

T. Hall
Jefferson Medical College
1916

A MANUAL

OF

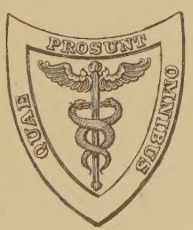
MATERIA MEDICA

FOR MEDICAL STUDENTS

BY

E. QUIN THORNTON, M.D.

ASSISTANT PROFESSOR OF MATERIA MEDICA IN THE JEFFERSON MEDICAL COLLEGE
PHILADELPHIA



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PHILADELPHIA AND NEW YORK

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PREFACE

HAVING taught Materia Medica in the laboratory and lecture room for a number of years, the author has formed definite views as to what students should learn, of how much they are capable of mentally digesting, and of the best method of presenting the facts. These views he has embodied in this Manual.

The object of a course in Materia Medica in a medical college is to lay the foundation for the course in Therapeutics, so far as the names, sources, physical properties, composition, doses, and methods of administering the drugs, chemicals, and preparations are concerned.

A text-book on Materia Medica to be of value to medical students must cover the subject thoroughly, avoiding the common error of extended discussions of physiological action and medicinal uses, both which properly belong to the domain of Therapeutics.

However, the study of Materia Medica would be dry indeed if the commoner actions and uses of drugs were passed over entirely, and therefore such references are given to these subjects as are thought to be of interest to students and likely to create in them a desire for more knowledge.

It is not expected that students will be able to comprehend demonstrations and lectures upon the physiological action and medicinal uses of remedies until they have been instructed as to the normal functions of the tissues and organs, and the manner in which these functions are altered by disease.

Part I of this Manual is devoted to the discussion of Posology, Prescription Writing, Latin Essentials in Prescription Writing, Incompatibility, and Weights and Measures.

Part II, the most important section of the book, is devoted to the discussion of all drugs, chemicals, and preparations official in the *United States Pharmacopœia*. Particular attention is given to official Latin and English names, synonyms, sources, physical properties, common incompatibilities, important constituents, methods of administration, doses, and to the ingredients of compound preparations.

Descriptions of drugs and chemicals are given precisely and briefly, but elaborate discussion of actions, uses, poisonous effects, and antidotes is avoided.

Part III gives a complete list of the United States Pharmacopœial preparations, arranged according to pharmaceutical classes. The composition and methods of preparing them are stated. This part of the book is intended as a guide for students working in the Laboratory of Pharmacy.

The doses stated in this Manual are such as are intended for administration to adults; the smaller doses may, if desired, be repeated, but the larger ones are intended only for urgent or unusual cases, when a powerful effect is desired. These larger doses must not be repeated without a clear understanding that they may give rise to overaction or even toxic effects.

In the Appendix a complete alphabetical list of official substances is given, with the *average* dose for adults, in accordance with the *United States Pharmacopœia*.

To Dr. Leighton F. Appleman, I wish to acknowledge my indebtedness and gratitude for valuable assistance of a varied nature, both during the preparation of this Manual and its passage through the press.

E. Q. T.

PHILADELPHIA, 1911.

CLASSIFICATION OF OFFICIAL DRUGS AND CHEMICALS

OFFICIAL CHEMICAL COMPOUNDS

I. Inorganic

Non-metals

Hydrogen and *Oxygen*
- Aqua
- Aqua Destillata
- Aqua Hydrogenii Dioxidi

Carbon
- Carbo Animalis
- Carbo Animalis Purificatus
- Carbo Ligni
- Carbonei Disulphidum

Silicon
- Kaolinum
- Talcum
- Talcum Purificatum

Halogens and Hydracids

Chlorine
- Acidum Hydrochloricum
- Acidum Hydrochloricum Dilutum

Bromine
- Bromum
- Acidum Hydrobromicum
- Acidum Hydrobromicum Dilutum

Iodine
- Iodum
- Acidum Hydriodicum Dilutum

Cyanogen

- Acidum Hydrocyanicum Dilutum

Phosphorus, Sulphur, and Oxyacids

Nitrogen
- Acidum Nitricum
- Acidum Nitricum Dilutum
- Acidum Nitrohydrochloricum
- Acidum Nitrohydrochloricum Dilutum

Phosphorus
- Phosphorus
- Acidum Phosphoricum
- Acidum Phosphoricum Dilutum
- Acidum Hypophosphorosum
- Acidum Hypophosphorosum Dilutum

Boron
- Acidum Boricum

Sulphur
- Acidum Sulphuricum
- Acidum Sulphuricum Dilutum
- Acidum Sulphurosum
- Sulphur Sublimatum
- Sulphur Lotum
- Sulphur Præcipitatum
- Sulphuris Iodidum

Metals

Alkali Group

Potassium
- Potassii Acetas
- Potassii Bicarbonas
- Potassii Bitartras
- Potassii Bromidum
- Potassii Carbonas
- Potassii Chloras
- Potassii Citras
- Potassii Citras Effervescens
- Potassii Cyanidum
- Potassii Dichromas
- Potassii et Sodii Tartras
- Potassii Ferrocyanidum
- Potassii Hydroxidum
- Potassii Hypophosphis
- Potassii Iodidum
- Potassii Nitras
- Potassii Permanganas
- Potassii Sulphas

Sodium
- Sodii Acetas
- Sodii Arsenas
- Sodii Arsenas Exsiccatus

Sodium
- Sodii Benzoas
- Sodii Bicarbonas
- Sodii Bisulphis
- Sodii Boras
- Sodii Bromidum
- Sodii Carbonas Monohydratus
- Sodii Citras
- Sodii Chloras
- Sodii Chloridum
- Sodii Hydroxidum
- Sodii Hypophosphis
- Sodii Iodidum
- Sodii Nitras
- Sodii Nitris
- Sodii Phenolsulphas
- Sodii Phosphas
- Sodii Phosphas Effervescens
- Sodii Phosphas Exsiccatus
- Sodii Salicylas
- Sodii Sulphas
- Sodii Sulphis
- Sodii Thiosulphas

Lithium
- Lithii Benzoas
- Lithii Bromidum
- Lithii Carbonas
- Lithii Citras
- Lithii Citras Effervescens
- Lithii Salicylas

Ammonium
- Ammonii Benzoas
- Ammonii Bromidum
- Ammonii Carbonas
- Ammonii Chloridum
- Ammonii Iodidum
- Ammonii Salicylas
- Ammonii Valeras

Alkaline Earth Group

Calcium
- Calx
- Calx Chlorinata
- Calx Sulphurata
- Calcii Bromidum
- Calcii Carbonas Præcipitatus
- Calcii Chloridum
- Calcii Hypophosphis
- Calcii Phosphas Præcipitatus
- Calcii Sulphas Exsiccatus
- Creta Præparata
- Liquor Calcis

Strontium
- Strontii Bromidum
- Strontii Iodidum
- Strontii Salicylas

Magnesium
- Magnesii Carbonas
- Magnesii Oxidum
- Magnesii Oxidum Ponderosum
- Magnesii Sulphas
- Magnesii Sulphas Effervescens

Aluminum
- Alumen
- Alumen Exsiccatum
- Alumini Hydroxidum
- Alumini Sulphas

Arsenic Group

Arsenic
- Arseni Trioxidum
- Arseni Iodidum

Antimony
- Antimonii et Potassii Tartras

Mercury Group

Silver
- Argenti Cyanidum
- Argenti Nitras
- Argenti Nitras Fusus
- Argenti Oxidum

Lead
- Plumbi Acetas
- Plumbi Iodidum
- Plumbi Nitras
- Plumbi Oxidum

Mercury
- Hydrargyrum
- Hydrargyrum Ammoniatum
- Hydrargyri Chloridum Corrosivum
- Hydrargyri Chloridum Mite
- Hydrargyri Iodidum Flavum
- Hydrargyri Iodidum Rubrum
- Hydrargyri Oxidum Flavum
- Hydrargyri Oxidum Rubrum

Copper
- Cupri Sulphas

Bismuth
- Bismuthi Citras
- Bismuthi et Ammonii Citras
- Bismuthi Subcarbonas
- Bismuthi Subgallas
- Bismuthi Subnitras
- Bismuthi Subsalicylas

Iron Group

Iron
- Ferrum
- Ferrum Reductum
- Ferri Chloridum
- Ferri Citras
- Ferri Hydroxidum
- Ferri Hypophosphis
- Ferri Phosphas Solubilis
- Ferri Pyrophosphas Solubilis
- Ferri Sulphas
- Ferri Sulphas Exsiccatus
- Ferri Sulphas Granulatus

Manganese
- Mangani Dioxidum
- Mangani Dioxidum Præcipitatum
- Mangani Hypophosphis
- Mangani Sulphas

Chromium
Chromii Trioxidum
Zinc
Zincum
Zinci Acetas
Zinci Bromidum
Zinci Carbonas Præcipitatus
Zinci Chloridum
Zinci Iodidum
Zinci Oxidum
Zinci Phenolsulphonas
Zinci Stearas
Zinci Sulphas
Zinci Valeras

Gold

Auri et Sodii Chloridum

Cerium

Cerii Oxalas

II. Organic

ALIPHATIC COMPOUNDS

Hydrocarbons

Benzinum
Paraffinum
Petrolatum
Petrolatum Album
Petrolatum Liquidum

Halogen Derivatives

Bromoformum
Chloroformum
Iodoformum
Æthylis Chloridum

Oxygen Derivatives

Alcohols
Alcohol
Alcohol Absolutum
Alcohol Dilutum
Glycerinum (Tri-atomic)
Aldehydes
Liquor Formaldehydi
Paraldehydum
Chloralum Hydratum
Ethers
Æther
Ketones
Acetonum
Fatty Acids
Monobasic
Acidum Aceticum
Acidum Aceticum Dilutum
Acidum Aceticum Glaciale
Acidum Stearicum
Fatty Acids
Chlorine Substitution
Acidum Trichloraceticum
Acids Not Fatty
Hydroxy
Acidum Lacticum
Dibasic
Acidum Tartaricum
Tribasic
Acidum Citricum
Esters
Æthylis Carbamas
Amyl Nitris

Sulphur Derivatives

Sulphones
Sulphonmethanum
Sulphonethylmethanum

AROMATIC COMPOUNDS

Hydroxyl Derivatives

Phenols
Monatomic
Phenol
Cresol
Thymol
Diatomic
Resorcinol
Eugenol
Triatomic
Pyrogallol

Oxygen Derivatives

Phenol Aldehydes
Vanillinum
Phenol Acids and *Esters*
Acidum Salicylicum
Acidum Gallicum
Acidum Tannicum
Methylis Salicylas
Phenylis Salicylas
Aromatic Aldehydes
Benzaldehydum
Cinnaldehydum
Aromatic Acids
Acidum Benzoicum

Polynucleated Compounds and Derivatives

Naphthalenes
Naphthalenum
Beta Naphthol
Terpenes
Terebenum
Terpini Hydras
Camphors
Camphora
Camphora Monobromata

Camphors
- Acidum Camphoricum
- Eucalyptol
- Menthol

Nitrogen Compounds

Amines
- Hexamethylenamine
- Methylthioninæ Hydrochloridum

Amids
- Chloralformamidum
- Acetanilidum

Imids
- Benzosulphinidum

Hydrazine Derivatives
- Antipyrina
- Acetphenetidinum

Pyrrole Derivatives
- Iodolum

OFFICIAL PRODUCTS OBTAINED FROM THE ANIMAL KINGDOM ARRANGED ACCORDING TO CLASSES

INVERTEBRATA

Insecta
- Hemiptera
  - Coccus
- Coleoptera
  - Cantharis
- Hymenoptera
  - Mel
  - Mel Depuratum
  - Cera Flava
  - Cera Alba

VERTEBRATA

Pices
- Teleostia
  - Oleum Morrhuæ

Mammalia
- Cetaceæ
  - Cetaceum
- Pachydermata
  - Adeps

Mammalia
- Oleum Adipis
- Pancreatinum
- Pepsinum
- Ruminantia
  - Moschus
  - Pancreatinum
  - Sevum Præparatum
  - Glandulæ Suprarenales Siccæ
  - Glandulæ Thyroideæ Siccæ
  - Adeps Lanæ
  - Adeps Lanæ Hydrosus
  - Fel Bovis
  - Fel Bovis Purificatum
  - Acidum Lacticum
  - Saccharum Lactis
  - Acidum Oleicum
  - Acidum Stearicum
  - Glycerinum
  - Gelatinum
  - Carbo Animalis
  - Carbo Animalis Purificatus
  - Serum Antidiphthericum

VEGETABLE DRUGS ARRANGED ACCORDING TO FAMILIES

Anacardiaceæ
- Mastiche
- Rhus Glabra

Apocynaceæ
- Apocynum
- Strophanthus

Araceæ
- Calamus

Aristolochiaceæ
- Serpentaria

Berberidaceæ
- Berberis
- Podophyllum

Betulaceæ
- Oleum Betulæ

Burseraceæ
- Myrrha

Campanulaceæ
- Lobelia

Caprifoliaceæ
- Viburnum Opulus
- Viburnum Prunifolium

Celastraciæ
- Euonymus

Chenopodiaceæ
- Oleum Chenopodii
- Saccharum

Compositæ
- Anthemis
- Arnica

Compositæ
Calendula
Eupatorium
Grindelia
Lactucarium
Lappa
Matricaria
Oleum Erigerontis
Pyrethrum
Santonica
Taraxacum
Conifera
Oleum Cadinum
Oleum Juniperi
Sabina
Terebinthina Canadensis
Convolvulaceæ
Jalapa
Scammonium
Cruciferæ
Sinapis Alba
Sinapis Nigra
Cucurbitaceæ
Colocynthis
Elaterinum
Pepo
Cupuliferæ
Galla
Quercus
Ericaceæ
Chimaphila
Oleum Gaultheriæ
Uva Ursi
Erythroxylaceæ
Coca
Euphorbiaceæ
Elastica
Oleum Ricini
Oleum Tiglii
Stillingia
Fagaceæ
Creosotum
Filices
Aspidium
Gentianaceæ
Chirata
Gentiana
Geraniaceæ
Geranium
Gigartinaceæ
Chondrus
Gramineæ
Amylum
Maltum
Saccharum
Triticum
Zea
Guttiferæ
Cambogia
Hamamelidaceæ
Hamamelidis Cortex
Hamamelidis Folia
Styrax
Hydrophyllaceæ
Eriodictyon
Hypocreaceæ
Ergota
Krameriaceæ
Krameria
Labiatæ
Hedeoma
Marrubrium
Mentha Piperita
Mentha Viridis
Oleum Lavandulæ Florum
Oleum Rosmarini
Oleum Thymi
Salvia
Scutellaria
Thymol
Lauraceæ
Camphora
Cinnamomum Saigonicum
Cinnamomum Zeylanicum
Oleum Cinnamomi
Sassafras
Sassafras Medulla
Leguminosæ
Acacia
Balsamum Peruvianum
Balsamum Tolutanum
Cassia Fistula
Chrysarobinum
Copaiba
Glycyrrhiza
Hæmatoxylon
Kino
Physostigma
Santalum Rubrum
Scoparius
Senna
Tamarindus
Tragacantha
Liliaceæ
Aloe
Colchici Cormus
Colchici Semen
Convallaria
Sarsaparilla
Scilla
Veratrina
Veratrum
Linaceæ
Linum
Loganiaceæ
Gelsemium
Nux Vomica
Spigelia
Lycopodiaceæ
Lycopodium
Magnoliaceæ
Oleum Anisi
Malvaceæ
Althæa
Gossypii Cortex
Gossypii Purificatum
Oleum Gossypii Seminis

Menispermaceæ
Calumba
Pareira
Moraceæ
Cannabis Indica
Ficus
Humulus
Lupulinum
Myristicaceæ
Myristica
Myrtaceæ
Caryophyllus
Eucalyptus
Oleum Cajuputi
Pimenta
Oleaceæ
Manna
Oleum Olivæ
Orchidaceæ
Cypripedium
Vanilla
Palmæ
Sabal
Papaveraceæ
Opium
Sanguinaria
Phytolaccaceæ
Phytolacca
Pinaceæ
Pix Liquida
Terebinthina
Piperaceæ
Cubeba
Matico
Piper
Polygalaceæ
Senega
Polygonaceæ
Rheum
Punicaceæ
Granatum
Ranunculaceæ
Aconitum
Cimicifuga
Hydrastis
Staphisagria
Rhamnaceæ
Frangula
Rhamnus Purshiana
Rosaceæ
Amygdala Amara
Amygdala Dulcis
Cusso
Oleum Rosæ
Prunum
Prunum Virginiana
Quillaja
Rosa Gallica
Rubus
Rubiaceæ
Cinchona
Cinchona Rubra
Gambir
Ipecacuanha
Rutaceæ
Aurantii Amari Cortex
Aurantii Dulcis Cortex
Buchu
Limonis Cortex
Limonis Succus
Pilocarpus
Xanthoxylum
Santalaceæ
Oleum Santali
Sapindaceæ
Guarana
Scrophulariaceæ
Digitalis
Leptandra
Silicaceæ
Salicinum
Simarubaceæ
Quassia
Solanacea
Belladonna Folia
Belladonna Radix
Capsicum
Hyoscyamus
Scopola
Stramonium
Sterculiaceæ
Oleum Theobromatis
Styraceæ
Benzoinum
Ternstræmiaceæ
Caffeina
Thymeleaceæ
Mezerium
Ulmaceæ
Ulmus
Umbelliferæ
Anisum
Asafœtida
Carum
Conium
Coriandrum
Fœniculum
Sumbul
Valerianaceæ
Valerian
Vitaceæ
Vinum Album
Vinum Rubrum
Zingiberaceæ
Cardamomum
Zingiber
Zygophyllaceæ
Guaiacum

A MANUAL OF MATERIA MEDICA

PART I

POSOLOGY—PRESCRIPTION WRITING—PRINCIPLES OF MEDICAL COMBINATIONS—INCOMPATIBILITIES

POSOLOGY

No fixed rule can be formulated for the administration of drugs. The members of certain classes of preparations are somewhat similar in dose; for example, it may be said that the extracts made from poisonous drugs are given in the dose of from $\frac{1}{8}$ to $\frac{1}{4}$ of a grain, but ordinarily the exceptions to such classifications are so numerous as to render them useless as a guide in learning the doses of numerous drugs and their preparations. The complex character of the patient, his individual disease and environment, calls for a careful study in order to prescribe intelligently. Individuals differ in their ability to take drugs; in determining this most important point, it is necessary to review the conditions which modify the quantity of medicine to be given. These consist in differences in age, weight, sex, temperament, climate, habits, disease, idiosyncrasy, frequency and method of administration, and the character of the drug or preparation administered.

Age.—The age of a patient calls for wide variations in dosage. In young children the determination of dosage is based upon the average adult dose. In this class of patients all vital functions are much more susceptible to change than in adults. They respond more quickly to drugs, hence great care must be exercised in the administration of powerful remedies.

Various rules have been formulated upon the age and weight of the child in order to determine the fraction of the adult dose which may be administered. These cannot be regarded as absolute, because of the difference in the severity of the diseases, and in the character of the drugs employed. It is well known that infants and young children are extremely sensitive to morphine and opiates, death resulting at times from seemingly very small doses, hence these drugs should be given in doses which are relatively smaller than other drugs.

One of the most frequently employed rules is that formulated by Dr. Young: "Divide the age of the child, in years, by the age plus twelve." For example, a child aged four years would require $\frac{4}{4+12} = \frac{4}{16}$, or $\frac{1}{4}$ of the dose of the drug for an adult.

Dr. R. O. Cowling's rule is: Divide the age of the child at its next birthday by 24; the quotient will be the fraction of the adult dose which is proper for a child of this age. For example, for a child aged three years the dose would be $3 \div 24 = \frac{3}{24}$, or $\frac{1}{8}$ of the dose for an adult.

Another rule, formulated by Dr. E. H. Clark, is based upon the weight of the child. Assuming that the average weight for an adult is 150 pounds, the weight of the child is divided by this amount, the quotient representing the fraction of the adult dose to be given. For example, for a child weighing 30 pounds, the proper dose would be $30 \div 150 = \frac{30}{150}$, or $\frac{1}{5}$ of the dose for an adult. The difference in weight, while apparently offering a good method for determining dosage, must be considered in conjunction with other physical conditions and characteristics which may completely alter the value of this method alone. As a rule, however, individuals of a large muscular build will require larger doses than those of small stature.

Sex.—Sex will materially modify the size of the doses of some remedies. Women, being smaller in stature and more susceptible to the action of drugs, particularly stimulating drugs, require smaller doses than men. Pregnancy, maternity, and menstruation contraindicate or modify the use of certain classes of drugs. Purgatives are often required in as large, or larger, doses as for men, probably because of lack of active exercise which would tend to promote peristalsis.

Temperament.—The temperament plays an important part in the susceptibility to drugs. Nervous, light-complexioned blondes respond more readily to drugs, especially to those acting on the nervous system, than do brunettes or dark-skinned, phlegmatic individuals.

Climate.—Climatic conditions under which patients live materially modify the amount of drug necessary to produce an effect similar to that seen under different climatic conditions. The torpidity of many vital functions in those persons living in tropical or subtropical countries necessitates the use of much larger doses of certain drugs than is necessary to produce the same effect in those living in temperate or colder climates. This is seen particularly in the use of hepatic stimulants under such conditions.

Habits.—A knowledge of the habits of a patient will aid in determining the dosage. Patients who are accustomed to taking any drug require larger amounts of the same drug to produce physiological effects than those who are unaccustomed to the drug. Morphine or opium habitués soon become accustomed to taking large amounts of these drugs, and in some instances enormous amounts are necessary to produce physiological effects. The ability to take large doses of drugs is increased in proportion to the amount of physical exertion which the patient is accustomed to undergo.

Nature and Period of Illness.—The quantity of a drug to be administered at a single dose depends, not infrequently, upon the nature of the illness and upon the period of the disease for which the drugs are desired. In the crises of acute infectious diseases, larger doses of cardiac stimulants are needed than would be required when slight feebleness of the circulation exists. Some patients are seized with the most malignant forms of disease, while others have mild forms of the same disease; in the first instance, much larger doses are required than in the second. The dose will vary according to what it is desired to accomplish. Ipecac or tartar emetic would be given in smaller doses as expectorants than as emetics. Likewise, in drugs having a purgative action, the dose as a purge would be proportionately greater than if a simple laxative effect were desired.

Idiosyncrasy.—Personal idiosyncrasy must always be borne in mind. An individual is said to have an idiosyncrasy to a drug when that drug produces unusual or possibly poisonous symptoms, showing that it has an effect out of proportion to that produced by an equal dose in other individuals.

Idiosyncrasies are frequently seen, and are manifested in a variety of ways: The administration of belladonna in doses much smaller than those ordinarily employed produces, in some persons, the characteristic symptoms of poisoning by that drug. Likewise quinine in small doses, in susceptible individuals, may give rise to roaring in the ears, deafness, vertigo, desquamation, and eruptions of the skin. On the other hand, some patients are able to take enormous doses of drugs which in the ordinary individual would produce poisoning and even death. Aside from drugs, certain fruits give rise to peculiar idiosyncrasies, such as itching of the skin or distinct eruptions of various kinds. When patients state that they are unable to take certain drugs, owing to peculiar or disagreeable effects, their statements should be heeded unless proved false.

Frequency of Administration.—The frequency of administration governs the size of the individual doses to a great extent; this in turn depends upon the rapidity of absorption and elimination, the cumulative action, and the needs of the patient. Drugs like ether, ammonia, or chloroform, which are quickly absorbed and quickly eliminated, should be given at short intervals, whereas such drugs as digitalis and potassium bromide, which are slowly absorbed and slowly eliminated, should be given at long intervals. Digitalis is a good example of a drug having a cumulative action. The beginning doses of this drug may be large, but in a short time they should be decreased, as the patient is influenced not only by the last dose which he has taken, but also by a certain proportion of previous doses which, not having been eliminated or oxidized, have accumulated in the body.

Methods of Administration.—The methods of administration will also govern the size of the individual dose, since the quantity of medicine actually absorbed and the readiness with which it acts will depend

upon the method employed for its introduction into the body. The most important methods of administering medicinal substances for their general effect on the body are the following:

1. By the mouth or stomach.
2. By hypodermic injection.
3. By the rectum.
4. By inhalation.
5. By inunction.
6. By fumigation.
7. By cataphoresis.
8. By the endermic method.

1. *Administration by the Mouth.*—The usual method of administering drugs is by the mouth, except in those cases in which on account of the urgency of the symptoms or for other special reasons other means are considered advisable.

In giving medicines by the mouth, the *time of administration* should be governed by the nature of the malady, by the character of the drugs employed, and by the form in which they are given. In diseases of the stomach itself, when a local action on this organ is desired, medicines should be given before meals when the stomach is empty, care being taken that the mucous membrane be freed from accumulated mucus or undigested food remaining from previous meals, which would interfere with a proper action of the drug. Powerful or irritating drugs and those which exercise an effect upon the general system should usually be given about half an hour after meals, in order that they may be diluted with the food and absorbed without irritating the walls of the stomach. Drugs which are designed for local action in the duodenum or small intestines should be given two or three hours after meals, depending upon the character of the food, at the time when gastric digestion is complete and the food is passing out of the stomach. At this time the drug is carried into the duodenum with the food and is less liable to be altered or absorbed by the stomach. This action may also be prevented by coating the drug, if given in solid form, with some substance which is insoluble in the gastric juice, but soluble in the duodenal secretions, such as phenyl salicylate, or keratin.

The *form* in which a drug should be administered by the mouth depends upon what it is desired to accomplish; all liquid preparations are absorbed much more rapidly than are solids, such as extracts, pills, capsules, and compressed tablets. Alcoholic solutions act much more rapidly than aqueous solutions. Hot solutions are more prompt in their action than cold solutions. From this it will be seen that in case of fainting, shock, or in the crises of acute diseases, an alcoholic preparation given hot when the stomach is empty, or if volatile, given cold and followed by a hot drink, would act most promptly. When it is desirable to prolong the action of the preparation or drug over as long a period as possible, it should be given with the food, in pill form or in capsules, as it would then be slowly dissolved, hence slowly absorbed.

2. *Administration by the Hypodermic Method.*—Next to the administration of drugs by the mouth, the hypodermic method is employed most frequently. The instrument used for this purpose consists of a glass or metal tube, holding about 30 minims, to which a hollow needle may be attached, and which is fitted with a graduated piston or plunger. A solid glass or metal plunger, or one rendered tight by means of a rubber washer, is best suited for administering liquids, such as ether, chloroform, etc., which dissolve the oil from pistons fitted with leather washers. Before using this instrument, care should be exercised that it has been thoroughly cleansed and rendered perfectly aseptic. The skin through which the injection is to be made should receive the same careful attention. The drug, if in the form of small hypodermic tablets, should be dissolved in from 10 to 30 minims of sterile water, and this solution drawn into the syringe and the needle attached. The instrument should then be held with the needle pointing upward and the air expelled by gentle pressure on the plunger. The tissues should then be grasped loosely between the thumb and forefinger of the left hand and the needle inserted quickly, in a slanting direction, into the subcutaneous connective tissue of this raised fold. The liquid may then be forced slowly into the tissues, the needle withdrawn and the wound of entrance closed with collodion, although this is not usually necessary. The best locations to give such injections are the extensor surface of the forearm, the abdominal wall, the back, and the calves of the legs. The extensor surfaces of the arm should be avoided. This method is used under those circumstances in which very prompt action is desired, such as collapse, shock, and at the time of crisis. Its advantages consist of rapid action, avoidance of alteration of the drug by the action of the gastric juice, and certainty of the dose.

Medicines used in this way must be in sterile, aqueous solution, freshly prepared. Compressed tablets of alkaloidal salts for hypodermic use are now to be had in short tubes holding from 20 to 25 tablets each, which may be readily carried in the pocket. These are entirely free from any foreign material, and are freely soluble. They may be dissolved in a teaspoon at the bedside or in the syringe itself if it has a screw hole large enough to admit the tablet. Alcoholic liquids such as brandy or whisky, tinctures, and fluidextracts of powerful drugs, or, in fact, any substance which is fairly soluble, non-irritating, and sufficiently clean that it will not produce an abscess, may be given hypodermically. Irritant preparations, such as spirit of ammonia or aromatic spirit of ammonia, should not be used by this method, except in cases of emergency, on account of the danger of producing sloughs.

The dose of medicines by hypodermic injection should be only one-half to one-fourth of that given by the mouth. If any known idiosyncrasy exists, or if very powerful remedies are used, the proportion should be still less, at least at first.

Hypodermic medication is contraindicated in the presence of general anasarca and when the peripheral circulation is extremely feeble.

This method is now used for the administration of antitoxin which is sold in hermetically sealed, sterile glass containers, which can be readily converted into a syringe without danger of contamination and then thrown away after it is used.

3. *Administration by the Rectum.*—The rectum may be used as a means of introducing drugs into the general system by absorption; as a means of nourishing the patient; for the removal of parasites, intestinal obstructions, and products of decomposition; to reduce the temperature by the introduction of cold water or to furnish heat to the body by injections of hot water; and for local medication to the rectum or lower bowel.

These purposes may be fulfilled by the use of solutions, rectal suppositories or capsules. The terms "enema," "clyster," and "lavement" are used to designate this form of medication. The term "enema" is loosely applied to all liquid injections intended for introduction into the rectum for therapeutic or nutritive purposes, although "nutritive enema" is a more definite term when food is administered in this way.

Drugs which are used by enema should be soluble and non-irritating, and when employed for their systemic effects they should be dissolved in only enough liquid to render their administration easy; usually from 2 to 4 fluidounces is sufficient in an adult. If larger quantities are used, the walls of the rectum may be so stimulated that spasmodic contraction with expulsion of all the rectal contents will occur. The same quantity is sufficient when local effect is desired or when food is given in this way. The dose of drugs by the rectum is about twice as large as that given by the mouth. Their absorption is facilitated by first giving an enema for the purpose of cleansing the bowel. For this purpose normal salt solution is less irritating to the mucous membrane than ordinary water. Food is usually first peptonized, in order that it may be absorbed more rapidly, as this process is normally slow in this portion of the alimentary tract.

When employing liquids for the purpose of removing fecal accumulations, intestinal obstructions, parasites, or products of decomposition, large quantities may be used. All forms of rectal injections should be given gently in order to avoid irritation of the rectum. Large injections are best given by means of a fountain syringe or a suitable reservoir to which a long rubber tube may be attached. These reservoirs should be placed not more than one or two feet above the patient, so that the liquid may pass into the bowel slowly, thus avoiding sudden distention and reflex contraction of the rectum With proper care, from one to three quarts may be passed in an adult, and from one to three pints in a child without producing reflex contraction and expulsion.

Suppositories may be used to administer drugs for systemic and local effects.

4. *Administration by Inhalation.*—Medicines in the form of a vapor, gas, or atomized spray may be inhaled by the patient for systemic effect, or for local action on the nasal, laryngeal, and bronchial mucous mem-

branes. One of the most important uses of this method is in the production of general anesthesia. Scarcely less important is the use of this method in administering amyl nitrite for the prevention of paroxysms of asthma, epileptic seizures when preceded by an aura, and attacks of angina pectoris. In the treatment of bronchial affections and spasmodic affections of the respiratory tract, the inhalation of moist air or steam laden with various volatile substances, such as creosote or compound tincture of benzoin, does much to relieve the irritation and general distress. The bronchitis tent is valuable for this purpose. This is made by fastening sheets over the bed in such a way that it will be entirely enclosed as in a tent, and into this tent small quantities of steam may be constantly liberated.

Sprays or atomizers in various forms are now employed for local medication to the upper respiratory tract, compressed air, steam, hand, or bulb pressure being used. Compressed air or steam pressure is preferable to hand pressure, as the spray is finer and is inhaled more readily into the deeper portions of the lungs.

5. *Administration by Inunction.*—Inunctions consist in rubbing fatty or oily substances into the skin for local or systemic effects. This method may be employed in addition to other means of medication when it is necessary to bring the patient under the influence of a drug as quickly as possible, as, for example, in those cases of syphilis, now rarely seen, in which the patient seems overwhelmed by the infection. In these cases the inunction of mercurial ointment into the skin is a valuable aid in getting the patient quickly under the influence of that drug. Absorption is favored in this method if the skin is first cleansed with hot water and soap, and the application made to those portions of the body where the skin is thin and well supplied with lymphatics, as below the axillæ, in the groins, or the inside of the thighs, care being taken to avoid the hairy portions, as inflammation of the hair follicles may result. When mercurial inunctions are to be continued for several days a different location should be selected for each application in order to avoid local irritation and inflammation.

Inunctions are employed in the administration of cod-liver oil in the treatment of strumous and anemic children, and locally over enlarged glands for the purpose of causing their absorption. The systemic effect may be increased by allowing the patient to wear a shirt or abdominal binder saturated with the medicinal substance.

The disadvantages of inunctions are: The inability to regulate the amount of drug taken into the body; it is uncleanly and disagreeable to apply. When powerful remedies, such as oleate of aconitine, veratrine, or phenol ointments are used, care must be taken to not apply them too freely because of the danger of poisoning by absorption.

6. *Administration by Fumigation.*—Fumigations or vapor baths are another means of causing the absorption of mercury by the skin. The patient, nude, is seated on a chair and surrounded by a large blanket which is securely fastened about the neck. Steam is liberated underneath the blanket and the patient is allowed to perspire freely. At

the same time, calomel is sublimed by means of a special apparatus, and the vapor, rising with the steam, surrounds the patient completely and is absorbed through the skin.

7. *Administration by Cataphoresis.*—Cataphoresis is a means of introducing drugs into the body by the use of the electric current.

8. *Administration by the Endermic Method.*—The endermic method is not employed at the present time. It was formerly used for the administration of alkaloids, such as morphine, strychnine, and quinine, before the introduction of the hypodermic method. The endermic method consisted in raising a blister, then removing the epidermis and applying the alkaloid to the raw surface—a very painful process.

PRESCRIPTION WRITING

The word prescription is derived from the Latin word præscriptio, (*præ*, "before," and *scribo*, "to write"). Prescriptions are written formulæ for drugs or their preparations which are intended for internal or external use, with directions for compounding and administering the same. They are usually written at the time the patient is seen, and contain such remedies as are believed to be necessary for his relief.

Prescriptions are usually written in Latin because it is the language of science and, therefore, universally understood; it is a dead language and not liable to undergo change. The Latin names for medicines are very nearly the same in all countries, and they give definite information as to the character of drugs or their preparations. For example, by the use of the official Latin name Bismuthi subgallas, in a prescription, a clearer understanding of the character of this substance is obtained than could be obtained from the use of the term "dermatol," by which it is sometimes known.

Prescriptions are divided into two general classes: (1) Simple prescriptions, which consist of but a single remedy; (2) compound prescriptions, which are combinations of two or more remedies. They are also divided into *solid* prescriptions, such as pills, capsules, suppositories, etc., and *liquid* prescriptions, such as emulsions, mixtures,liniments, etc.

Official prescriptions are those in which the formulæ are stated in the *United States Pharmacopœia.*

Magistral or *extemporaneous prescriptions* are those in which the ingredients are combined with the object of meeting the requirements of individual cases, and are compounded according to the directions of the prescriber.

So-called "shotgun" prescriptions are unscientific forms of compound prescriptions which contain an unnecessarily large number of remedies with the hope that some one of them may fulfil the requirements of the case. Such prescriptions usually show a lack of knowledge of the action of drugs on the part of the prescriber. A "kangaroo" prescription is one which contains a drug which has an action so fleeting that the effects of one dose have entirely disappeared some time before

the next dose is to be taken, so that the patient is not continuously under its influence. As the name indicates, there are long leaps or intervals between successive doses.

Parts of Compound Prescription.—The component parts of a compound prescription are the following:

1. The name of the patient.
2. The superscription or heading.
3. The inscription.
4. The subscription or directions to the compounder.
5. The signa, signatura, or directions to the patient as to how to employ the preparation.
6. Name of physician.
7. Date.

1. *Name of Patient.*—The name of the patient should always be placed at the top of a prescription and copied upon the label by the apothecary. Neglect of this has been attended with fatal results through the administration of a remedy to a child when intended for an adult, owing to similarity in the appearance of the two preparations. The presence of the name on a prescription also enables the compounder to know whether the remedy is intended for an adult or a child, and any discrepancy in its dosage detected. The name may be omitted for the sake of delicacy in prescriptions calling for urethral, vaginal, or rectal injections, and from others when its presence would betray secrets which should be jealously guarded.

2. *Superscription.*—The superscription, or heading, consists, in Latin prescriptions, of the symbol ℞, which is an abbreviation of the word *recipe*, meaning "take thou," the imperative of the Latin verb *recipio* (I take). This symbol is probably the remains of an ancient sign, or talisman, which, in its original form, was like a Z, with a line across the lower horizontal part. This, or a modification of it, has always been the symbol of the planet Jupiter (♃), in Greek, Zeus. Among the ancient Greeks and Romans the administration of medicines and even the gathering of herbs were supposed to be influenced by the position of the planets, and therefore this symbol was placed as a heading to prescriptions, since without some such invocation it was believed that no good would be derived from the physician or his remedies.

3. *Inscription.*—The inscription, or names and quantities of the ingredients, constitutes the most important part of the prescription. The quantities used in writing prescriptions in Apothecaries' system of weights and measures are expressed in Roman numerals, when writing in the Metric system they are expressed by the Arabic numerals. The inscription consists of the *basis*, which is written first, as it is the principal ingredient. In many instances the basis is all that is employed, as the requirements of the case may be fulfilled by this alone. It is the rule to use as few drugs as possible unless the indications are clear for the combination of several. The next in order, in a compound prescription, is the *adjuvant*, or aid to the basis, to assist its action.

As an example of this may be mentioned the administration of ammonium chloride as a stimulant to the bronchial mucous membrane in a case of chronic bronchitis, to which ammonium carbonate may be added as an adjuvant to also aid in liquefying the mucus and to act as a supportant to the heart.

The *corrective* is a substance used to modify any undesirable effect of the basis or adjuvant, or to disguise taste or odor. For example, fluidextract of liquorice may be added to the above-mentioned basis and adjuvant to disguise their salty taste.

The *vehicle*, sometimes spoken of as the diluent, or solvent, is used as a medium for administration. This may be one of the aromatic waters, syrup, mucilage, aromatic elixir, or one of the weaker tinctures, depending upon the character and solubility of the drugs used. In preparing solids, such as pills, troches, and masses, the substance used to give them adhesiveness and bulk is known as the *excipient*. Among the substances employed for this purpose are the extracts of gentian, licorice, or taraxacum, soap, acacia, tragacanth, and oil of theobroma.

In naming the drugs which enter into a prescription, they should always be designated by their Latin official names. The use of synonyms for this purpose is not permissible, owing to a number of different drugs being known by the same synonym, as for example, the term "snake-root," applied to senega, serpentaria, and cimicifuga; "wormseed," to chenopodium and santonin.

The quantity of each ingredient is designated by the Roman numerals j, ij, iij, iv, v, vj, vij, viij, ix, x, xj, xij, xiij, xx, xxx, xl, l, lx, lxx, lxxx, xc, c, etc., which are placed after the abbreviation of the unit, and by certain signs and abbreviations of the units, as follows:

℥ Minim, $\frac{1}{60}$ of a fluidram.
gtt. Gutta, a drop; plural, guttæ.
℈ Scrupulus, a scruple (20 grains), rarely used. It is usually written gr. xx.
gr. Granum, a grain; plural, grana.
ʒ Drachma, a dram (60 grains).
f ʒ Fluidrachma, a fluidram (60 minims).
℥ Uncia, a troy ounce (480 grains).
f ℥ Fluiduncia, a fluidounce (8 fluidrams).
lb Libra, a pound, rarely used in prescriptions (5760 grains).
O Octarius, a pint (16 fluidounces).
C Congius, a gallon (8 pints of 128 fluidounces), used very rarely in prescriptions.
ss Semis, a half.
āā Ana, of each.
q. s. ad Quantum sufficit ad, a quantity sufficient up to.

4. *Subscription.*—The subscription, or directions to the compounder, should be written in Latin. The single letter "M," an abbreviation for Misce, mix, is used when two or more substances are combined, and this is followed by the directions as to the form of preparation desired; for example, if pills are to be prescribed, *Fiat massa et in pilulas*

duodecim dividatur—Let a mass be made and divided into twelve pills. For a solution, *Fiat solutio*—Let a solution be made; *Fiat ceratum*—Let a cerate be made; *Fiant pulveres duodecim*—Let twelve powders be made. When no specific directions are necessary, it should be compounded according to the rules of the art—*Fiat secundum artis regulas.*

5. *Signa, Signatura, or Directions.*—The signa, signatura, or directions to the patient are usually abbreviated *Sig.* The directions should always be written out clearly and fully in English so that the patient may readily understand them. The practice of writing no directions except "As directed," or "Use as directed," is a bad one and liable to cause serious mistakes. Verbal directions are frequently misunderstood or forgotten in the stress of mental excitement incident to a consultation with the physician. Under such circumstances the pharmacist is sometimes appealed to, and being unable to give satisfactory answer, the patient is compelled to return to the physician for instructions. The definite statement of the dose to be taken enables the pharmacist to detect possible errors, and thus prevent accidents from overdose. In writing the directions for any prescription a definite interval between doses should be stated; for example, "One teaspoonful in water every three hours." Never write "every three or four hours," as it allows the patient to exercise his own judgment about a subject of which he knows nothing. More importance will be attached to a definite statement as to the time of taking the medicine, and the directions will be more consistently followed. Under certain circumstances it is advisable to omit explicit directions, as in case of urethral or vaginal injections. These may be written on a separate paper and given to the patient, while on the prescription the words "Wash," or "For external use only," may be written. If verbal directions alone are given they should be very explicit and the patient should be required to repeat them to the physician in order that he may determine that they are fully understood.

If the patient is seen at his home, the physician may write his directions out in full; or, if a well-trained nurse is in attendance, the directions for giving medicines, food, etc., will be recorded upon charts used especially for that purpose.

Labels calling attention to the fact that prescriptions are for "External use only," "Not to be taken internally," "Poison," "Shake well before using," etc., should be attached when occasion requires.

6. *Name of the Physician.*—The name of the physician, followed by "M.D.," in order that there may be no question as to the authority of the writer to prescribe, and also his address, should be attached to all prescriptions which are written on ordinary paper. This is important because it is sometimes necessary for the pharmacist to communicate quickly with the physician regarding an error or ambiguity. In those instances in which the physician uses blanks bearing his name, address, and office hours the use of his initials is all that is necessary.

7. *Date.*—The date should be written after each prescription in order to identify it, should any question arise later in reference to it.

When prescribing powerful, poisonous drugs or drugs, to which the patient may become addicted, the directions "Do not renew," or "Not to be refilled," should be appended. This is of importance for several reasons: (1) To prevent the patient from using the same prescription at a future time or at another stage of the same disease when, in his opinion, the symptoms are the same; (2) he would thus be prevented from giving it to another member of his family, or to a friend suffering from the same symptoms; it is well known that the dose of any remedy for one person may be distinctly harmful to another differing in age, temperament, or physical condition. As has been well said, "One man's meat may be another man's poison," and the influence of individual idiosyncrasy causes the widest variations in the doses of the same drug when administered to different individuals.

Again, the same drug may relieve a symptom which is not attributed to its true cause by the patient, and if administered by him to another person suffering from the same symptom but of totally different origin the condition of the sufferer would probably be made worse by the drug.

For these reasons it is better that the words "Do not renew" shall be printed, or written, at the bottom of the physician's prescription blanks. It is customary for pharmacists to attach a small label to the container of such prescriptions stating that the physician has directed that such an order should be complied with. In those cases in which the physician desires the patient to continue the use of the prescription over a long period of time without an order for renewal, he may simply draw his pen through this line.

Quantity of Ingredients in a Prescription.—The method for determining the total quantity of each ingredient which enters into a prescription is as follows: The names of the basis, adjuvant, corrective, vehicle, or excipient are written on separate lines in the proper order without affixing quantities; then having determined the total number of doses to be given and the quantity to be given at each dose, the total amount of each ingredient can be found by multiplying the number of doses by the amount of a single dose of each ingredient, as in the following prescription, in which it is desired to give 24 doses of 1 fluidram, or 1 teaspoonful each:

Name of patient: John Williams.
Superscription: ℞.
Inscription:
Basis: Ammonii chloridi, 2½ grains in each dose, 24 x 2½ grains = 60 grains or ʒj.
Adjuvant: Ammonii carbonatis, 5 grains at each dose, 24 x 5 grains = 120 grains or ʒij.
Corrective: Fluidextracti glycyrrhizæ, 30 minims at each dose, 24 x 30 = 720 minims or fʒiss.
Vehicle: Aquæ destillatæ, enough to make 1 fʒ in each dose, 24 x 1 fʒ = 24 fluidrams or fʒiij.
Subscription: Misce.
Directions to the patient: Sig.—Take one teaspoonful in two tablespoonfuls of water every three hours.
Name of physician: A. B. C., M.D.
Date: June 8, 1911.

The approximate metric equivalents for the same prescription would be:

℞—Ammonii chloridi, 0.15 Gm. at each dose, 24 x 0.15 = 3.6 Gm.
Ammonii carbonatis, 0.3 Gm. at each dose, 24 x 0.3 = 7.2 Gm.
Fluidextracti glycyrrhizæ, 2.0 Cc. at each dose, 24 x 2.0 = 48.0 Cc.
Aquæ destillatæ enough to make 4.0 Cc. at each dose, 24 x 4 = 96 Cc.

Care should be exercised in determining the quantity of medicine ordered. Let only such an amount be ordered as will tide the patient over his present illness or stage of his disease for which it is ordered.

Very large or unusual doses of powerful, poisonous drugs, when ordered intentionally, should be so expressed on the prescription that the pharmacist will understand that it is so desired and will not hesitate to compound it. Such doses are usually emphasized by *underscoring*, or by writing it in both Roman and Arabic numerals, or in both the Apothecaries' and Metric systems, and by the use of the exclamation mark (!). Each prescription should be read carefully by the writer in order to make any corrections or additions before it is given to the patient.

Abbreviations.—Abbreviations are necessary and unobjectionable provided that they are sufficiently full to allow of no doubt as to what drug is desired. Great care is necessary to avoid ambiguities. The following examples illustrate the errors that may arise through careless abbreviation:

Acid. hydroc.	Acidum hydrochloricum.	Hyd. chlor.	Hydrargyri chloridum mite.
	Acidum hydrocyanicum.		Hydrargyri chloridum corrosivum.
Aconit.	Aconitina.		Hydrated chloral.
	Aconitum.	Podophyl.	Podophyllum.
Aqua chlor.	Aqua chlori.		Podophyllinum.
	Aqua chloroformi.	Potass. iod.	Potassii iodidum.
Cal. sulph.	Calcii sulphas.		Potassii iodas.
	Calcii sulphis.	Potass. sulph.	Potassii sulphas.
	Calx sulphurata.		Potassii sulphis.
Cal. chlor.	Calcii chloridum.		Potassii sulphidum.
	Calx chlorinata.		Potassii sulphocarbonas.
Chlor.	Chlorine.		Potassii sulphocyanas.
	Chloroformum.	Potass. nit.	Potassii nitras.
	Chloral.		Potassii nitris.
Cinchon. sulph.	Cinchoninæ sulphas.	Sodii sulph.	Sodii sulphas.
	Cinchonidinæ sulphas.		Sodii sulphis.
Ext. col.	Extractum colchici.	Sulph.	Sulphur.
	Extractum colocynthidis.		Sulphonal.
Elat.	Elaterinum.		Sulphas.
	Elaterium.		Sulphis.
			Sulphidum.

Minims and Drops.—In computing doses, the difference between a *minim* and a *drop* should always be borne in mind. A minim is always a constant quantity, being the sixtieth part of a fluidram, independent of the character of the liquid under consideration. A drop is a variable quantity, depending upon the viscidity and temperature of the liquid and the shape of the vessel from which it is dropped. Aqueous liquids

usually measure from 40 to 70 drops to the fluidram, while alcoholic liquids and volatile oils measure from 100 to 150 drops to the fluidram.

The following table gives the number of drops of various official preparations to the fluidram and the weight of the fluidram in grains:

Name.	Drops in f℥j.	Weight of f℥j in grains.
Acetum opii	90	61
Acetum scillæ	68	57
Acidum aceticum	108	58
Acidum aceticum dilutum	68	55
Acidum hydrochloricum	70	65
Acidum hydrochloricum dilutum	60	56
Acidum hydrocyanicum dilutum	60	54
Acidum nitricum	102	77
Acidum nitricum dilutum	60	58
Acidum nitrohydrochloricum	76	66
Acidum phosphoricum dilutum	59	57
Acidum sulphuricum	128	101
Acidum sulphuricum aromaticum	146	53
Acidum sulphuricum dilutum	60	58½
Acidum sulphuricum sulphurosum	59	55
Æther	176	39
Alcohol	146	44
Alcohol dilutum	137	49
Aqua	60	55
Aqua ammoniæ fortior	66	50
Aqua destillata	60	53½
Bromum	250	165
Chloroformum	250	80
Copaiba	110	51
Creosotum	122	56½
Fluidextractum belladonnæ radicis	156	57
Fluidextractum buchu	150	47½
Fluidextractum cimicifugæ	147	48
Fluidextractum cinchonæ	138	58
Fluidextractum colchici seminis	158	55
Fluidextractum conii	137	61
Fluidextractum digitalis	134	62
Fluidextractum ergotæ	133	60
Fluidextractum gelsemii	149	49
Fluidextractum glycyrrhizæ	133	61
Fluidextractum hyoscyami	160	59
Fluidextractum ipecacuanhæ	120	60
Fluidextractum pareiræ	140	57
Fluidextractum rhei	158	61
Fluidextractum sarsaparillæ compositum	134	60
Fluidextractum senegæ	137	62
Fluidextractum serpentariæ	148	47
Fluidextractum uvæ ursi	137	60
Fluidextractum veratri	150	50
Fluidextractum zingiberis	142	48
Glycerinum	67	68
Liquor acidi arsenosi	75	56
Liquor ammonii acetatis	57	55
Liquor arseni et hydrargyri iodidi	58	55
Liquor ferri chloridi	71	72
Liquor ferri subsulphatis	73	83
Liquor ferri tersulphatis	83	72
Liquor hydrargyri nitratis	131	123
Liquor iodi compositus	63	59
Liquor plumbi subacetatis	74	70
Liquor potassii hydroxidi	62	58
Liquor potassii arsenitis	57	55
Liquor sodæ chlorinatæ	63	62
Liquor zinci chloridi	89	88
Oleoresina aspidii	130	52
Oleoresina capsici	120	51
Oleoresina cubebæ	123	52
Oleum æthereum	125	50
Oleum amygdalæ amaræ	115	55
Oleum amygdalæ expressum	108	48½
Oleum anisi	119	54
Oleum caryophylli	130	57
Oleum cinnamomi	126	53½
Oleum copaibæ	123	49½
Oleum cubebæ	125	51
Oleum fœniculi	125	53
Oleum gaultheriæ	125	62
Oleum juniperi	148	49
Oleum lavandulæ	138	52
Oleum limonis	129	47
Oleum menthæ piperitæ	129	50
Oleum ricini	77	51½
Oleum rosæ	132	47
Oleum rosmarini	143	50
Oleum sassafras	133	58
Oleum terebinthinæ	136	45½

Name.	Drops in f3j.	Weight of f3j in grains.
Oleum tiglii	104	50
Spiritus ætheris compositus	148	45
Spiritus ætheris nitrosi	146	47
Spiritus ammoniæ aromaticus	142	48
Spiritus camphoræ	143	47
Spiritus chloroformi	150	48
Spiritus menthæ piperitæ	142	47
Syrupus	65	72
Syrupus acaciæ	44	73
Syrupus ferri iodidi	65	77
Syrupus scillæ	75	74
Syrupus scillæ compositus	102	70
Syrupus senegæ	106	70
Tincturæ aconiti	146	46
Tincturæ belladonnæ foliorum	137	53
Tincturæ benzoini compositus	148	48
Tincturæ cantharidis	131	51
Tincturæ cinchonæ compositus	140	49
Tincturæ digitalis	128	53
Tincturæ ferri chloridi	150	53
Tincturæ iodi	148	47
Tincturæ nucis vomicæ	140	44
Tincturæ opii	130	53
Tincturæ opii camphoratæ	130	52
Tincturæ opii deodorati	110	54
Tincturæ veratri	145	46
Vinum opii	100	55

LATIN ESSENTIALS IN PRESCRIPTION WRITING

There are eight parts of speech in Latin, four of which—nouns, adjectives, pronouns, and verbs—are inflected, while the other four—adverbs, prepositions, conjunctions and interjections—remain unchanged.

By inflection we mean the change in form or termination which words undergo to denote their relation to other words. Nouns, adjectives, and pronouns have inflections of *declension*, to denote gender, number, and case. Verbs have inflections of *conjugation*, to denote voice, mood, tense, number, and person. Adjectives have inflections of *comparison*, to denote degree.

The body of a word, to which the terminations are attached, is called the "stem" or root of the word, and is found by dropping the case ending of the genitive singular.

There are three genders in Latin, as in English, the masculine, feminine, and neuter, but these have little to do with sex as we understand it.

Nouns, pronouns, and adjectives are declined in the two numbers—singular, and plural; and in six cases—nominative, genitive, dative, accusative, vocative, and ablative. The *nominative* corresponds to the English nominative, the *genitive* to the English possessive, and the *accusative* to the English objective. Each case has, as a rule, its own proper ending, except the nominative and vocative, which are usually alike. In neuter nouns the nominative, accusative, and vocative are alike.

Declensions.—There are five declensions in Latin, distinguished by the case ending of the genitive singular. The following tables contain nearly all the case endings arranged according to the declensions:

Singular.

Declension	i	ii	iii	iv	v
Case.					
Nominative	a	us, um	es, is	us, u	es
Genitive	æ	i	is	us	ei
Dative	æ	o	i	ui, u	ei
Accusative	am	um	em, im	um, u	em
Vocative	a	e	es, is	us, u	es
Ablative	a	o	e, i	u	e

Plural.

Declension	i	ii	iii	iv	v
Case.					
Nominative	æ	i, a	es, a, ia	us, ua	es
Genitive	arum	orum	um, ium	uum	erum
Dative	is	is	ibus	ibus, ubus	ebus
Accusative	as	os, a	es, a	us, ua	es
Vocative	æ	i, a	es, a	us, ua	es
Ablative	is	is	ibus	ibus, ubus	ebus

First Declension.—Nouns of the first declension are feminine and end in -a, except the Greek nouns, Aloe and Mastiche. They are declined as follows:

	Singular.		Plural.		
Nom.	Aqua,	Water.	Nom.	Aquæ,	Waters.
Gen.	Aquæ,	Of water.	Gen.	Aquarum,	Of waters.
Dat.	Aquæ,	To water.	Dat.	Aquis,	To waters.
Acc.	Aquam,	Water.	Acc.	Aquas,	Waters.
Voc.	Aqua,	O water.	Voc.	Aquæ,	O waters.
Abl.	Aqua,	By, with, or from water.	Abl.	Aquis,	By, with, or from waters.

The exceptions, Aloe and Mastiche, are declined as follows:

Singular.

Nom.	Aloe,	The aloe.	Acc.	Aloem,	The aloe.
Gen.	Aloes,	Of the aloe.	Voc.	Aloe,	O aloe.
Dat.	Aloe,	To the aloe.	Abl.	Aloe,	By, with, or from the aloe.

The endings of the plural are the same as those of Aqua.
The following nouns of the first declension are declined like Aqua:

Acacia.	Calendula.	Chimaphila.	Creta.
Aconitina.	Calumba.	Chirata.	Cubeba.
Ammonia.	Cambogia.	Cimicifuga.	Drachma.
Amygdala.	Camphora.	Cinchona.	Elastica.
Antipyrina.	Capsula.	Cinchonidina.	Ergota.
Apomorphina.	Cascara.	Cinchonina.	Fistula.
Arnica.	Cassia.	Coca.	Fluidrachma.
Asafœtida.	Centifolia.	Cocaina.	Fluiduncia.
Atropina.	Cera.	Codeina.	Folia.
Belladonna.	Charta.	Convallaria.	Frangula.
Caffeina.	Chartula.	Copaiba.	Galla.

Gaultheria.
Gentiana.
Glycyrrhiza.
Grindelia.
Guarana.
Gutta.
Guttapercha.
Hexamethylenamina.
Homatropina.
Hydrastina.
Hyoscina.
Hyoscyamina.
Ichthyocolla.
Ignatia.
Indica.
Ipecacuanha.
Jalapa.
Krameria.
Lana.
Lappa.
Lavendula.
Leptandra.
Libra.
Liquida.
Lobelia.
Manna.
Massa.
Matricaria.
Medulla.
Mentha.
Mistura.
Morphina.
Morrhua.
Myristica.
Myrrha.
Oleoresina.
Oliva.
Pareira.
Phytolacca.
Pilocarpina.
Pilula.
Pimenta.
Piperina.
Purshiana.
Quassia.
Quillaja.
Quinidina.
Quinina.
Resina.
Rosa.
Sabina.
Salvia.
Sanguinaria.
Santonica.
Sarsaparilla.
Scilla.
Scopola.
Scopolamina.
Scutellaria.
Senega.
Senna.
Serpentaria.
Spigelia.
Sparteina.
Stillingia.
Strychnina.
Tabella.
Terebinthina.
Theobromina.
Tinctura.
Tragacantha.
Uncia.
Uva.
Valeriana.
Vanilla.
Veratrina.
Vomica.
Zea.

Second Declension.—Nouns of the second declension ending in -us, -os, -er, and -ir are masculine; those ending in -um are neuter. The names of pharmacopœial substances end in -us, or in -um. They are declined as follows:

	Masculine.		Neuter.		
	Singular	Plural		Singular	Plural
Nom.	Syrupus.	Syrupi.	Nom.	Extractum.	Extracta.
Gen.	Syrupi.	Syruporum.	Gen.	Extracti.	Extractorum.
Dat	Syrupo.	Syrupis.	Dat.	Extracto.	Extractis.
Acc.	Syrupum.	Syrupos.	Acc.	Extractum.	Extracta.
Voc.	Syrupe.	Syrupi.	Voc.	Extractum.	Extracta.
Abl.	Syrupo.	Syrupis.	Abl.	Extracto.	Extractis.

The following nouns of the second declension are declined like Syrupus:

Calamus.
Caryophyllus.
Chondrus.
Coccus.
Congius.
Eucalyptus.
Euonymus.
Ficus.
Humulus.
Hyoscyamus.
Juniperus.
Moschus.
Octarius.
Phosphorus.
Pilocarpus.
Prunus.
Rhamnus.
Ricinus.
Rubus.
Scoparius.
Scrupulus.
Strophanthus.
Succus.
Tamarindus.
Thymus.
Trochiscus.
Ulmus.
Ursus.
Vitellus.

The following neuter nouns are declined like Extractum:

Acetanilidum.
Acetphenetidinum.
Acetum.
Acidum.
Aconitum.
Aloinum.
Aluminum.
Ammonium.
Amylum.
Anisum.
Antimonium.
Apocynum.
Argentum.
Arsenum.
Aspidium.
Aurantium.
Aurum.
Balsamum.
Barium.
Benzoinum.
Benzosulphinidum.
Benzinum.
Bismuthum.
Bisulphidum.
Benzaldehydum.
Boricum.
Boroglycerinum.
Bromidum.
Bromoformum.
Bromum.

Calcium.
Capsicum.
Carbonicum.
Cardamomum.
Carum.
Ceratum.
Cerium.
Cetaceum.
Chelidonium.
Chenoidinum.
Chenopodium.
Chloralformamidum.
Chloralum.
Chloridum.
Chloroformum.
Chlorum.
Chromicum.
Chrysarobinum.
Cinnaldehydum.
Cinnamomum.
Colchicum.
Collodium.
Conium.
Coriandrum.
Creosotum.
Cuprum.
Cyanidum.
Cypripedium.
Decoctum.
Depuratum.
Dioxidum.
Disulphidum.
Elaterinum.
Emplastrum.
Emulsum.
Eupatorium.
Extractum.
Ferrocyanidum.
Ferrum.
Fluidextractum.
Fœniculum.
Folium.
Frumentum.
Galbanum.
Gelsemium.
Geranium.
Glonoinum.
Glycerinum.
Glyceritum.
Glycyrrhizinum.
Gossypium.
Granatum.
Granum.
Guaiacum.
Hydrargyrum.
Hydrobromidum.
Hydrochloridum.
Infusum.
Ingluvinum.
Iodidum.
Iodoformum.
Iodum.
Lactucarium.
Lignum.
Linimentum.
Linum.
Lithium.
Lupulinum.
Lycopodium.
Magnesium.
Maltum.
Manganum.
Marrubium.
Menispermum.
Mezereum.
Minimum.
Naphthalenum.
Nitroglycerinum.
Oleatum.
Oleum.
Opium.
Ovum.
Oxidum.
Pancreatinum.
Paraldehydum.
Pepsinum.
Petrolatum.
Petroleum.
Phosphidum.
Picrotoxinum.
Piperinum.
Plumbum.
Podophyllum.
Potassium.
Prunifolium.
Prunum.
Pyrethrum.
Pyroxylinum.
Resorcinum.
Rheum.
Saccharum.
Safrolum.
Salicinum.
Santalum.
Santonicum.
Scammonium.
Sevum.
Sodium.
Stramonium.
Strontium.
Succinum.
Sulphidum.
Suppositorium.
Tabacum.
Tanacetum.
Tannicum.
Taraxacum.
Terebenum.
Tiglium.
Triticum.
Unguentum.
Veratrum.
Viburnum.
Vinum.
Xanthoxylum.
Xericum.
Zincum.

Third Declension.—Nouns of the third declension end in a, e, i, o, y, c, l, m, r, s, t, and x in the nominative singular, but the genitive singular always ends in -is; sometimes with an additional syllable (an increment) and -is, as, *Nom.* Pulvis, *Gen.* Pulveris; sometimes only by the addition of -is to the nominative singular, as, *Nom.* Æther, *Gen.* Ætheris; and sometimes, when the nominative singular ends in -is, the word is not changed in the genitive, as, *Nom.* Digitalis, *Gen.* Digitalis.

It will be necessary for the student to memorize the termination of the genitive singular and the gender of the words of this declension.

Masculine and feminine nouns are declined like Æther, as follows:

Singular.				Plural.			
Nom.	Æther.	Acc.	Ætherem.	Nom.	Ætheres.	Acc.	Ætheres.
Gen.	Ætheris.	Voc.	Æther.	Gen.	Ætherum.	Voc.	Ætheres.
Dat.	Ætheri.	Abl.	Æthere.	Dat.	Ætheribus.	Abl.	Ætheribus.

Neuter nouns are declined in a similar manner except that the nominative, accusative, and vocative are alike. The following table shows the endings of the nominative and genitive singular of the nouns of this declension:

Nominative.	Genitive.	Nominative.	Genitive.
Acetas.	Acetatis.	Lac (n).	Lactis.
Adeps.	Adipis.	Lactas.	Lactatis.
Albumin (n).	Albuminis.	Lactophosphas.	Lactophosphatis.
Alcohol (n).	Alcoholis.	Limon.	Limonis.
Alumen.	Aluminis.	Liquor.	Liquoris.
Amyl.	Amylis.	Lotio.	Lotionis.
Animal.	Animalis.	Macis.	Macidis.
Anthemis.	Anthemidis.	Mel (n).	Mellis.
Arsenas.	Arsenatis.	Methyl.	Methylis.
Arsenis.	Arsenitis.	Mucilago.	Mucilaginis.
Benzoas.	Benzoatis.	Nitras.	Nitratis.
Berberis.	Berberidis.	Nitris.	Nitritis.
Bicarbonas.	Bicarbonatis.	Nux.	Nucis.
Bichromas.	Bichromatis.	Oxalas.	Oxalatis.
Bisulphas.	Bisulphatis.	Panis.	Panis.
Bisulphis.	Bisulphitis.	Pars.	Partis.
Bitartras.	Bitartratis.	Pepo.	Peponis.
Boras.	Boratis.	Permanganas.	Permanganatis.
Bos.	Bovis.	Phenol.	Phenolis.
Bulliens.	Bullientis.	Phenyl.	Phenylis.
Calx.	Calcis.	Phosphas.	Phosphatis.
Cannabis.	Cannabis.	Physostigma (n).	Physostigmatis.
Cantharis.	Cantharidis.	Piper (n).	Piperis.
Carbo.	Carbonis.	Pix.	Picis.
Carbonas.	Carbonatis.	Pulvis.	Pulveris.
Chloras.	Chloratis.	Pyrophosphas.	Pyrophosphatis.
Citras.	Citratis.	Radix.	Radicis.
Cochleare.	Cochlearis.	Rhus.	Rhois or Roris.
Colocynthis.	Colocynthidis.	Rumex.	Rumicis.
Confectio.	Confectionis.	Salicylas.	Salicylatis.
Cortex.	Corticis.	Salix.	Salicis.
Cresol.	Cresolis.	Santoninas.	Santoninatis.
Dichromas.	Dichromatis.	Sapo.	Saponis.
Digitalis.	Digitalis.	Semen (n).	Seminis.
Effervescens.	Effervescentis.	Silicas.	Silicatis.
Elixir.	Elixiris.	Sinapis.	Sinapis.
Emulsio.	Emulsionis.	Styrax.	Styracis.
Erigeron.	Erigerontis.	Subacetas.	Subacetatis.
Fel (n).	Fellis.	Subcarbonas.	Subcarbonatis.
Fervens.	Ferventis.	Subnitras.	Subnitratis.
Flos.	Floris.	Subsulphas.	Subsulphatis.
Guaiacol.	Guaiacolis.	Sulphas.	Sulphatis.
Hamamelis.	Hamamelidis.	Sulphis.	Sulphitis.
Hirudo.	Hirudonis.	Sulphur (n).	Sulphuris.
Hydras.	Hydratis.	Tartras.	Tartratis.
Hydrastis.	Hydrastis.	Tersulphas.	Tersulphatis.
Hypophosphis.	Hypophosphitis.	Theobroma.	Theobromatis.
Hyposulphis.	Hyposulphitis.	Trituratio.	Triturationis.
Iris.	Iridis.	Valeras.	Valeratis.
Juglans.	Juglandis.	Zingiber (n).	Zingiberis.

Fourth Declension.—Fourth declension nouns end in -us in the nominative masculine, and in -u in the neuter. The genitive singular ends in -us. Masculine nouns are declined like Spiritus, as follows:

Singular.				Plural.			
Nom.	Spiritus.	Acc.	Spiritum.	Nom.	Spiritus.	Acc.	Spiritus.
Gen.	Spiritus.	Voc.	Spiritus.	Gen.	Spirituum.	Voc.	Spiritus.
Dat.	Spiritui.	Abl.	Spiritu.	Dat.	Spirituibus.	Abl.	Spirituibus.

Fifth Declension.—Nouns of the fifth declension are feminine and end in -es in the nominative singular. They are declined as follows:

Singular.				Plural.			
Nom.	Res, a thing.	Acc.	Rem.	Nom.	Res.	Acc.	Res.
Gen.	Rei.	Voc	Res.	Gen.	Rerum.	Voc.	Res.
Dat.	Rei.	Abl.	Re.	Dat.	Rebus.	Abl.	Rebus.

The following nouns are not declinable:

Azedarach.	Catechu.	Eucalyptol.	Matico.	Quebracho.	Sassafras.
Buchu.	Cusso.	Gambir.	Naphthol.	Quercus.	Sumbul.
Cajuput.	Diachylon.	Kino.	Pyrogallol.	Sabal.	Urethan.

Adjectives.—Adjectives are generally formed and declined like nouns. They agree with the nouns which they qualify in gender, number, and case. They are declined like nouns, and are (1) of the first and second declension or (2) of the third declension.

Adjectives of the first and second declensions end in -us or -er in the nominative singular masculine, and are declined throughout in the gender like masculine nouns of the second declension; in the feminine, they end in -a and are declined like nouns of the first declension; in the neuter, they end in -um and are declined like neuter nouns of the second declension. Albus, white, is declined as follows:

Singular.				Plural.			
	Masculine.	Feminine.	Neuter.		Masculine.	Feminine.	Neuter.
Nom.	Albus.	Alba.	Album.	Nom.	Albi.	Albæ.	Alba.
Gen.	Albi.	Albæ.	Albi.	Gen.	Alborum.	Albarum.	Alborum.
Dat.	Albo.	Albæ.	Albo.	Dat.	Albis.	Albis.	Albis.
Acc.	Album.	Albam.	Album.	Acc.	Albos.	Albas.	Alba.
Voc.	Albe.	Alba.	Album.	Voc.	Albi.	Albæ.	Alba.
Abl.	Albo.	Alba.	Albo.	Abl.	Albis.	Albis.	Albis.

The following adjectives and participles are declined like Albus:

Absolutus.	Burgundicus.	Depuratus.
Abstractus.	Camphoratus.	Destillatus or distillatus.
Aceticus.	Cantharidatus.	Dilutus.
Ætheris.	Carbolicus.	Dimidius.
Alcoholicus.	Catharticus.	Expressus.
Amarus.	Chloratus.	Exsiccatus.
Americanus.	Chromicus.	Extractus.
Ammoniatus.	Citratus.	Flavus.
Aromaticus.	Compositus.	Fusus.
Arsenosus.	Citricus.	Gallicus.
Benzoicus.	Corrosivus.	Glaber, -ra, -um.
Benzoinatus.	Crudus.	Granulatus.
Boricus.	Deodoratus.	Hydratus.

Hydriodicus.
Hydrobromicus.
Hydrochloricus.
Hydrocyanicus.
Hydrosus.
Hypophosphorosus.
Idæus.
Infusus.
Inspissatus.
Iodatus.
Lacticus.
Liquidus.
Latus.
Marinus.
Monobromatus.
Monohydratus.
Niger, -ra, -rum.
Nitricus.
Nitrohydrochloricus.
Odoratus.
Oleicus.
Oxidatus.
Parvus.
Peruvianus.
Phosphoratus.
Phosphoricus.
Piperitus.
Ponderosus.
Præcipitatus.
Præparatus.
Purificatus.
Purus.
Rectificatus.
Reductus.
Ruber, -ra, -rum.
Saccharatus.
Saigonicus.
Salicylicus.
Siccus.
Spissus.
Stypticus.
Sublimatus.
Sulphuratus.
Sulphuricus.
Sulphurosus.
Tannicus.
Tartaricus.
Tolutanus.
Virginianus.
Zeylanicus.

There are three classes of adjectives in the third declension depending upon the number of endings of the nominative singular, which may be one, two, or three. Those having two terminations are the most important from a pharmacological standpoint. They end in -is in the masculine and feminine and in -e in the neuter, as follows:

Singular.				Plural.			
Masculine and Feminine.		Neuter.		Masculine and Feminine.		Neuter.	
Nom.	Mitis, mild.	Nom.	Mite.	Nom.	Mites.	Nom.	Mitia.
Gen.	Mitis.	Gen.	Mitis.	Gen.	Mitium.	Gen.	Mitium.
Dat.	Miti.	Dat.	Miti.	Dat.	Mitibus.	Dat.	Mitibus.
Acc.	Mitem.	Acc.	Mite.	Acc.	Mites.	Acc.	Mitia.
Voc.	Mitis.	Voc.	Mite.	Voc.	Mites.	Voc.	Mitia.
Abl.	Miti.	Abl.	Miti.	Abl.	Mitibus.	Abl.	Mitibus.

The following are similarly declined:

Æqualis.
Animalis.
Antimonialis.
Barbadensis.
Canadensis.
Communis.
Dulcis.
Flexilis.
Fluvialis.
Fortis.
Glacialis.
Mollis.
Nivalis.
Pluvialis.
Semissis.
Solubilis.
Venalis.
Viridis.
Volatilis.
Vegetabilis.

Numeral adjectives are of three kinds: cardinals, ordinals, and distributives. Cardinals answer the question, how many? Ordinals, which in order.

Cardinals.	Ordinals.	Distributives.
Unus, una, unum, one.	Primus, -a, -um, first.	Singuli, one by one.
Duo, duæ, duo, two.	Secundus, -a, -um, second.	Bini, two by two.
Tres, tria, three.	Tertius, -a, -um, third.	Terni, three each.
Quattuor, four.	Quartus, fourth.	Quaterni, four each.
Quinque, five.	Quintus, fifth.	Quini, five each.
Sex.	Sextus.	Seni.
Septem.	Septimus.	Septeni.
Octo.	Octavus.	Octoni.
Novem.	Nonus.	Noveni.
Decem.	Decimus.	Deni.
Undecim.	Undecimus.	Undeni.

	Cardinals.	Ordinals.	Distributives.
	Duodecim.	Duodecimus.	Duodeni.
	Tredecim.	Tertius decimus.	Terni deni.
	Quattuordecim.	Quartus decimus.	Quaterni deni.
	Quindecim.	Quintus decimus.	Quini deni.
	Sedecim.	Sextus decimus.	Seni deni.
	Septendecim.	Septimus decimus.	Septeni deni.
	Duodeviginti.	Duodevicesimus.	Duodeviceni.
	Undeviginti.	Undevicesimus.	Undeviceni.
	Viginti.	Vicesimus.	Viceni.
21	Viginti unus.	Vicesimus primus.	Viceni singuli.
	Unus et viginti.	Unus et vicesimus.	Singuli et viceni.
22	Viginti duo.	Vicesimus secundus.	Viceni bini.
	Duo et viginti.	Alter et vicesimus.	Bini et viceni.
28	Duodetriginta.	Duodetricesimus.	Duodetriceni.
29	Undetriginta.	Undetricesimus.	Undetriceni.
30	Triginta.	Tricesimus.	Triceni.
	Quadraginta.	Quadragesimus.	Quadrageni.
	Quinquaginta.	Quinquagesimus.	Quinquageni.
	Sexaginta.	Sexagesimus.	Sexageni.
	Septuaginta.	Septuagesimus.	Septuageni.
	Octoginta.	Octogesimus.	Octogeni.
	Nonaginta.	Nonagesimus.	Nonageni.
	Centum.	Centesimus.	Centeni.

The cardinals from quattuor to centum, inclusive, are indeclinable. Unus, Duo, and Tres are declined as follows:

	Singular.			Plural.		
	Masculine.	Feminine.	Neuter.	Masculine.	Feminine.	Neuter.
Nom.	Unus.	Una.	Unum.	Uni.	Unæ.	Una.
Gen.	Unius.	Unius.	Unius.	Unorum.	Unarum.	Unorum.
Dat.	Uni.	Uni.	Uni.	Unis.	Unis.	Unis.
Acc.	Unum.	Unam.	Unum.	Unos.	Unas.	Una.
Voc.	Une.	Una.	Unum.	Uni.	Unæ.	Una.
Abl.	Uno.	Una.	Uno.	Unis.	Unis.	Unis.

	Duo, two.			Tres, three.	
	Masculine.	Feminine.	Neuter.	Masculine and Feminine.	Neuter.
Nom.	Duo.	Duæ.	Dua.	Tres.	Tria.
Gen.	Duorum.	Duarum.	Duorum.	Trium.	Trium.
Dat.	Duobus.	Duabus.	Duobus.	Tribus.	Tribus.
Acc.	Duos.	Duas.	Dua.	Tres.	Tria.
Voc.	Duo.	Duæ.	Dua.	Tres.	Tria.
Abl.	Duobus.	Duabus.	Duobus.	Tribus.	Tribus.

Ordinals are declined like adjectives of the first and second declensions.

Numeral adverbs answer the question, How many times? They are:

Semel, once.	Noviens.	Septiesdeciens.	Sexagiens.
Bis, twice.	Deciens.	Duodeviciens.	Septuagiens.
Ter, thrice.	Undeciens.	Undeviciens.	Octogiens.
Quater.	Duodeciens.	Viciens.	Nonagiens.
Quinquiens.	Terdeciens.	Semel et viciens.	Centiens.
Sexiens.	Quaterdeciens.	Triciens.	Ducentiens.
Septiens.	Quindeciens.	Quadragiens.	
Octiens.	Sedeciens.	Quinquagiens.	

Verbs.—A verb is a word which affirms something of a person or thing. For the purposes of this book it is only necessary to study those parts of the verb employed in prescription writing.

Most transitive verbs have two voices, active and passive. In the active voice the verb represents the person as acting; in the passive voice it represents the person as acted upon.

There are four conjugations or methods of inflecting the verb, distinguished from one another by the endings of the present infinitive active, as follows:

First conjugation verbs end in -are.

Second conjugation verbs end in -ere.

Third conjugation verbs end in -ere.

Fourth conjugation verbs end in -ire.

In the active voice, the imperative second person singular and the subjunctive third person singular are the only parts used in prescription writing. In the passive voice, the infinitive, the third person singular subjunctive, the gerund or future participle, and the past participle are the only parts employed.

The *imperative, second person singular, active,* is used in giving directions to the compounder, and is formed by dropping the termination -re of the infinitive; for example:

Agitare, to shake. (1st conj.)	Agita, shake (thou).
Miscere, to mix. (2d conj.)	Misce, mix (thou).
Dividere, to divide. (3d conj.)	Divide, divide (thou).
Deglutire, to swallow. (4th conj.)	Degluti, swallow (thou).

The *subjunctive, third person singular, active,* is formed by adding the following terminations to the stem of the verb:

In the 1st conjugation, -et; thus, agit-et, let him shake.
In the 2d conjugation, -eat; thus, misc-eat, let him mix.
In the 3d conjugation, -at; thus, divid-at, let him divide.
In the 4th conjugation, -iat; thus, deglut-iat, let him swallow.

The *infinitive passive* is formed in all conjugations except the third by changing the final -e of the infinitive active to -i; as:

Agitari, to be shaken.
Misceri, to be mixed.
Deglutiri, to be swallowed.

In the third conjugation, the infinitive passive is formed by adding -i to the root; as: Divid-i, to be divided.

The *subjunctive, third person singular, passive,* is formed by adding -ur to the present subjunctive, thus:

Agitet-ur, let it be shaken.
Misceat-ur, let it be mixed.

The *future participle passive,* or gerund, is formed by adding the following endings to the stem of the verb:

In the 1st conjugation, -andus, -a, -um.
In the 2d conjugation, -endus.
In the 3d conjugation, -endus.
In the 4th conjugation, -iendus.

Thus:

Agitandus, about to be shaken.
Miscendus, about to be mixed.
Dividendus, about to be divided.
Deglutiendus, about to be swallowed.

The following verbs are most frequently used in prescription writing:

First Conjugation, Active Voice.

Pres. Indicative.		Pres. Infinitive.	Pres. Subjunctive.	Imperative.
Administro,	I administer.	Administrare.	Administret.	Administra.
Agito,	I shake.	Agitare.	Agitet.	Agita.
Applico,	I apply.	Applicare.	Applicet.	Applica.
Colo,	I strain.	Colare.	Colet.	Cola.
Continuo,	I continue.	Continuare.	Continuet.	Continua.
Do,	I give.	Dare, to give.	Dat, let him give.	Da, give.
Evaporo,	I evaporate.	Evaporare.	Evaporet.	Evapora.
Inhalo,	I inhale.	Inhalare.	Inhalet.	Inhala.
Macero,	I macerate.	Macerare.	Maceret.	Macera.
Manduco,	I chew.	Manducare.	Manducet.	Manduca.
Paro,	I prepare.	Parare.	Paret.	Para.
Poto,	I drink.	Potare.	Potet.	Pota.
Præparo,	I prepare.	Præpare.	Præparet.	Præpara.
Pulvero,	I pulverize.	Pulverare.	Pulveret.	Pulvera.
Purgo,	I purge.	Purgare.	Purget.	Purga.
Renovo,	I renew.	Renovare.	Renovet.	Renova.
Servo,	I keep.	Servare.	Servet.	Serva.
Signo,	I mark.	Signare.	Signet.	Signa.
Usurpo,	I use.	Usurpare.	Usurpet.	Usurpa.

First Conjugation, Passive Voice.

Pres. Infinitive.	Pres. Subjunctive.	Past Participle.	Gerundive.
Administrari, to be administered.	Administretur.	Administratus.	Administrandus.
Agitari, to be shaken.	Agitetur	Agitatus.	Agitandus.
Applicari, to be applied.	Applicetur.	Applicatus.	Applicandus.
Colari, to be strained.	Coletur.	Colatus.	Colandus.
Continuari, to be continued.	Continuetur.	Continuatus.	Continuandus.
Dari, to be given.	Detur, let him be given.	Datus, given.	Dandus, to be given.
Evaporari, to be evaporated.	Evaporetur.	Evaporatus.	Evaporandus.
Inhalari, to be inhaled.	Inhaletur.	Inhalatus.	Inhalandus.
Macerari, to be macerated.	Maceratur.	Maceratus.	Macerandus.
Manducari, to be chewed.	Manducetur.	Manducatus.	Manducandus.
Parari, to be prepared.	Paretur.	Paratus.	Parandus.
Potari, to be drunk.	Potetur.	Potatus.	Potandus.
Præparari, to be prepared.	Præparetur.	Præparatus.	Præparandus.
Pulverari, to be pulverized.	Pulveretur.	Pulveratus.	Pulverandus.
Purgari, to be purged.	Purgetur.	Purgatus.	Purgandus.
Renovari, to be renewed.	Renovetur.	Renovatus.	Renovandus.
Servari, to be served.	Servetur.	Servatus.	Servandus.
Signari, to be marked.	Signetur.	Signatus.	Signandus.
Usurpari, to be used.	Usurpetur.	Usurpatus.	Usurpandus.

Second Conjugation, Active Voice.

Pres. Indicative.	Pres. Infinitive.	Pres. Subjunctive.	Imperative.
Adhibeo, I employ.	Adhibere.	Adhibeat.	Adhibe.
Admisceo, I mix with.	Admiscere.	Admisceat.	Admisce.
Admoveo, I apply.	Admovere, to apply.	Admoveat, let him apply.	Admove, apply.
Augeo, I increase.	Augere.	Augeat.	Auge.
Caveo, I shun.	Cavere.	Caveat.	Cave.
Cieo, I excite.	Ciere.	Cieat.	Cie.
Commisceo, I mix together.	Commiscere.	Commisceat.	Commisce.
Exhibeo, I administer.	Exhibere.	Exhibeat.	Exhibe.
Foveo, I ferment.	Fovere.	Foveat.	Fove.
Misceo, I mix.	Miscere.	Misceat.	Misce.
Moveo, I move.	Movare.	Moveat.	Move.
Permisceo, I mix through.	Permiscere.	Permisceat.	Permisce.
Promoveo, I promote.	Promovere.	Promoveat.	Promove.

Second Conjugation, Passive Voice.

Pres. Infinitive.	Pres. Subjunctive.	Past Participle.	Gerundive.
Adhiberi, to be employed.	Adhibeatur.	Adhibitus.	Adhibendus.
Admisceri, to be mixed with.	Admisceatur.	Admixtus.	Admiscendus.
Admoveri, to be applied.	Admoveatur, let it be applied.	Admotus, applied.	Admovendus, to be applied.
Augeri, to beincreased.	Augeatur.	Auctus.	Augendus.
Caveri, to be shunned.	Caveatur.	Cautus.	Cavendus.
Cieri, to be excited.	Cieatur.	Citus.	Ciendus.
Commisceri, to be mixed with.	Commisceatur.	Commixtus.	Commiscendus.
Exhiberi, to be administered.	Exhibeatur.	Exhibitus.	Exhibendus.
Foveri, to be fermented.	Foveatur.	Fotus.	Fovendus.
Misceri, to be mixed.	Misceatur.	Mixtus.	Miscendus.
Moveri, to be moved.	Moveatur.	Motus.	Movendus.
Permisceri, to be mixed through.	Permisceatur.	Permixtus.	Permiscendus.
Promoveri, to be promoted.	Promoveatur.	Promotus.	Promovendus.

Third Conjugation, Active Voice.

Pres. Indicative.	Pres. Infinitive.	Pres. Subjunctive.	Imperative.
Addo, I add.	Addere.	Addat.	Adde.
Adjicio, I add to.	Adjicere, to add to.	Adjiceat, let him add to.	Adjice, add.
Appono, I apply.	Apponere.	Apponat.	Appone.
Bibo, I drink.	Bibere.	Bibat.	Bibe.
Capio, I take.	Capere.	Capiat.	Cape.
Colluo, I wash.	Colluere.	Colluat.	Collue.
Concido, I slice.	Concidere.	Concidat.	Concide.
Concutio, I shake.	Concutere.	Concutiat.	Concute.
Conficio, I make complete.	Conficere.	Conficiat.	Confice.
Contero, I bruise.	Conterere.	Conterat.	Contere.
Contundo, I crush.	Contundere.	Contundat.	Contunde.
Coquo, I boil.	Coquere.	Coquat.	Coque.

Third Conjugation, Active Voice.

Pres. Indicative.	Pres. Infinitive.	Pres. Subjunctive.	Imperative.
Decoquo, I boil down.	Decoquere.	Decoquat.	Decoque.
Digero, I digest.	Digere.	Digeat.	Digere.
Divido, I divide.	Dividere.	Dividat.	Divide.
Exprimo, I express.	Exprimere.	Exprimat.	Exprime.
Extraho, I extract.	Extrahere.	Extrahat.	Extrahe.
Facio, I make.	Facere.	Faciat.	Fac.
Fundo, I pour.	Fundere.	Fundat.	Funde.
Mando, I chew.	Mandere.	Mandat.	Mande.
Mitto, I send.	Mittere.	Mittat.	Mitte.
Pono, I place.	Ponere.	Ponat.	Pone.
Præscribo, I prescribe.	Præscribere.	Præscribat.	Præscribe.
Rado, I scrape.	Radere.	Radat.	Rade.
Recipio, I receive.	Recipere.	Recipiat.	Recipe.
Redigo, I reduce.	Redigere.	Redigat.	Redige.
Repeto, I repeat.	Repetere.	Repetat.	Repete.
Solvo, I dissolve.	Solvere.	Solvat.	Solve.
Sumo, I take.	Sumere.	Sumat.	Sume.
Tero, I grind.	Terere.	Terat.	Tere.
Uro, I burn.	Urere.	Urat.	Ure.
Vomo, I vomit.	Vomere.	Vomat.	Vome.

Third Conjugation, Passive Voice.

Pres. Infinitive.	Pres. Subjunctive.	Past Participle.	Gerundive.
Addi, to be added.	Addatur.	Additus.	Addendus.
Adjici, to be added.	Adjiceatur, let it be added.	Adjectus, added.	Adjiciendus, to be added.
Apponi, to be applied.	Apponatur.	Appositus.	Apponendus.
Bibi, to be drunk.	Bibatur.	Bibitus.	Bibendus.
Capi, to be taken.	Capiatur.	Captus.	Capiendus.
Collui, to be washed.	Colluatur.	Collutus.	Colluendus.
Concidi, to be sliced.	Concidatur.	Consisus.	Concidendus.
Concuti, to be shaken.	Concutiatur.	Concussus.	Concutiendus.
Confici, to be made.	Conficiatur.	Confectus.	Conficiendus.
Conteri, to be bruised.	Conteratur.	Contritus.	Conterendus.
Contundi, to be crushed.	Contundatur.	Contusus.	Contundendus.
Coqui, to be boiled.	Coquatur.	Coctus.	Coquendus.
Decoqui, to be boiled down.	Decoquatur.	Decoctus.	Decoquendus.
Digeri, to be digested.	Digeatur.	Digestus.	Digerendus.
Dividi, to be divided.	Dividatur.	Divisus.	Dividendus.
Exprimi, to be expressed.	Exprimatur.	Expressus.	Exprimendus.
Extrahi, to be extracted.	Extrahatur.	Extractus.	Extrahendus.
Fieri, to be made.	Fiat.	Factus.	Faciendus.
Fundi, to be poured.	Fundatur.	Fusus.	Fundendus.
Mandi, to be chewed.	Mandatur.	Mansus.	Mandendus.
Mitti, to be sent.	Mittatur.	Missus.	Mittendus.
Poni, to be placed.	Ponatur.	Positus.	Ponendus.
Præscribi, to be prescribed.	Præscribatur.	Præscriptus.	Præscribendus.
Radi, to be scraped.	Radatur.	Rasus.	Radendus.
Recipi, to be received.	Recipiatur.	Receptus.	Recipiendus.
Redigi, to be reduced.	Redigatur.	Redactus.	Redigendus.
Repeti, to be repeated.	Repetatur.	Repetitus.	Repetendus.
Solvi, to be dissolved.	Solvatur.	Solutus.	Solvendus.
Sumi, to be taken.	Sumatur.	Sumptus.	Sumendus.
Teri, to be ground.	Teratur.	Tritus.	Terendus.
Uri, to be burnt.	Uratur.	Ustus.	Urendus.
Vomi, to be vomited.	Vomatur.	Vomitus.	Vomendus.

Fourth Conjugation, Active Voice.

Pres. Indicative.	Pres. Infinitive.	Pres. Subjunctive.	Imperative.
Deglutio, I swallow.	Deglutire, to swallow.	Deglutiat, let him swallow.	Degluti, swallow.
Dormio, I sleep.	Dormire.	Dormiat.	Dormi.
Haurio, I drink.	Haurire.	Hauriat.	Hauri.
Partio, I divide.	Partire.	Partiat.	Parti.

Fourth Conjugation, Passive Voice.

Pres. Infinitive.	Pres. Subjunctive.	Past participle.	Gerundive.
Deglutiri, to be swallowed.	Deglutiatur, let it be swallowed.	Deglutitus, swallowed.	Deglutiendus, to be swallowed.
Hauriri, to be drunk.	Hauriatur.	Haustus.	Hauriendus.
Partiri, to be divided.	Partiatur.	Partitus.	Partiendus.

Prepositions.—Prepositions are parts of speech which show the relations of objects to each other. They are regularly used either with the accusative or with the ablative. The following are used with the accusative:

Ad, to.
Ante, before, forward.
Circum, around.
Contra, against.
Extra, outside, without, beyond.
Infra, below.
Inter, between, among.
Intra, within.
Ob, on account of.
Per, through.
Post, after.
Præter, beyond.
Prope, near.
Secundum, according to.
Supra, above, over.
Trans, across.
Ultra, beyond.

The following are used with the Ablative:

A, ab, abs, from, by.
Cum, with.
De, from.
E, ex, out of.
In, in.
Pro, according to.
Sine, without.
Sub, under, beneath.

The following prepositions may be used with the accusative after verbs of motion, and with the ablative when denoting location:

In, into, in.
Sub, under, near.
Subter, beneath, sown under.
Super, over, above, excessive.

Conjunctions.—Conjunctions connect words, phrases, or sentences. The most important conjunctions used in prescription writing are the following:

Ac, atque, and.
Aut, or.
Aut, aut, either, or.
Autem, but.
Donec, until.
Dum, while.
Et, and.
Et, et, both, and.
Etiam, also.
Ergo, therefore.
Nec, nec, neither, nor.
Postquam, after.
Quam, than.
Quasi (quam si), as, if.
Que, and.
Quia, because.
Quoad, as long as.
Quoque, also.
Sed, but.
Si, if.
Ut, in order to.
Vel, vel, either, or.

Examples.—The symbol ℞, already referred to, at the beginning of a prescription signifies *recipe*, "take thou," being the second person singular, imperative mood, present tense of the verb recipio.

The quantity of each ingredient, if written out in full, should be put in the accusative case as object of the verb *recipe*. As a rule, the names of the ingredients in all compound prescriptions should be written in the genitive case when the quantity is expressed, as in the following:

Take one ounce of sodium sulphate.

℞—Sodii sulphatis . . . . . unciam unam.

Unciam is a feminine noun in the accusative singular, object of the verb recipe.

Unam is a numerical adjective, accusative singular, qualifying and agreeing with unciam.

Sulphatis is a feminine noun, genitive singular, qualifying unciam.

Sodii is a feminine noun, genitive singular, qualifying sulphatis.

In simple formulæ, in which the ingredients are not weighed or measured, but counted, as when prescribing pills, troches, and suppositories, the name of the ingredient should be written in the accusative case, as:

Take twelve compound cathartic pills.

℞—Pilulas catharticas compositas . . . . . xii.

A noun qualifying the meaning of another noun should be put in the genitive case, thus: Tinctura aconiti, tincture of aconite. Tinctura is a noun in the nominative case. Aconiti is placed in the genitive case, qualifying tinctura. In a prescription, the qualifying noun is unchanged, while the other is changed according to the rules governing it, thus:

Take one dram of tincture of aconite.

℞—Tincturæ aconiti . . . . . drachmam unam.

In this, the qualifying noun, aconiti, is not changed, while tinctura is changed to the genitive, tincturæ, qualifying drachmam.

The following Latin prescription, with its grammatical analysis, will be found helpful for a clear understanding of the formation of the Latin terminations in a prescription:

Superscription: ℞.
Inscription: (Basis) Ammon. chlorid. . . . . ʒiij.
(Adjuvant) Codein. sulph. . . . . gr. iv.
(Corrective) Fluidext. glycyrrh. . . . . fʒiij.
(Vehicle) Aq. cinnam. . . . . q. s. ad fʒiv.
Subscription: M. ft. sol.
Signatura: Cap. cochl. i parv. ter. q.q. hora ex paul. aqua.

Unabbreviated, this prescription would read as follows:

Recipe,
Ammonii chloridi . . . . . drachmas tres
Codeinæ sulphatis . . . . . grana quattuor
Fluidextracti glycyrrhizæ . . . . . fluiduncias tres
Aquæ cinnamomi . . . . . ad fluiduncias quattuor
Misce, fiat solutio.
Capiat cochleare unam parvam tertia quaqua hora ex paulo aqua.

Parsed and translated into English, it would be rendered as follows:

Recipe ammonii chloridi, drachmas tres.

℞ (recipe).	Irreg. tr. verb, imper. mood, 2d per. sing. agreeing with its noun Tu, "thou" (understood). Recipio, recipere, recepti, receptum.	Take thou.
iii (tres).	Num. adj. acc. pl. qualifying and agreeing with drachmas.	three.
ʒ (drachmas).	Fem. noun, 1st decl. acc. pl. object of the verb recipe. Drachma, -æ.	drachms.
chlorid. (chloridi).	Neut. noun, 2d decl. gen. sing. qualifying drachmas. Chloridum, -i.	of chloride.
ammon. (ammonii).	Neut. noun, 2d decl. gen. sing. qualifying chloridi. Ammonium, -i.	of ammonium.

Recipe codeinæ sulphatis, grana quattuor.

℞ (recipe).	Understood.	Take thou.
iv (quattuor).	Num. adj. indeclinable.	four
gr. (grana).	Neut. noun, 2d decl. gen. sing. direct object of verb recipe. Granum, -i.	grains.
sulph. (sulphatis).	Masc. noun, 3d decl. gen. sing. qualifying grana. Sulphas, -atis.	of sulphate.
codein. (codeinæ).	Fem. noun, 1st decl. gen. sing. qualifying sulphatis. Codeina, -æ.	of codeine.

Recipe fluidextracti glycrrhizæ, fluiduncias tres.

℞ (recipe).	Understood.	Take thou.
iii (tres).	Num. adj. acc. pl. qualifying and agreeing with fluiduncias.	three.
f ʒ (fluiduncias).	Fem. noun, 1st decl. acc. pl. direct object of verb recipe. Fluiduncia, -æ.	fluidounces.
fluidext. (fluidextracti).	Neut. noun, 2d decl. gen. sing. qualifying fluiduncias. Fluidextractum, -i.	of fluidextract.
glycyrrh. (glycyrrhizæ).	Fem. noun, 1st decl. gen. sing. qualifying fluidextracti. Glycyrrhiza, -æ.	of liquorice.

Recipe aquæ cinnamomi, ad fluiduncias quattuor.

℞ (recipe).	Understood.	Take thou.
ad	Preposition used adverbially.	up to.
iv (quattuor).	Num. adj. indeclinable.	four.
f ʒ (fluiduncias).	Fem. noun, 1st decl. acc. pl. direct object of verb recipe. Fluiduncia, -æ.	fluidounces.
aq. (aquæ).	Fem. noun, 1st decl. gen. sing. qualifying fluiduncias. Aqua, -æ.	of water.
cinnam. (cinnamomi).	Neut. noun, 2d decl. gen. sing. qualifying aquæ. Cinnamomum, -i.	of cinnamon.

Misce, fiat solutio.

M. (misce).	Trans. verb, imper. mood, pres. tense, agreeing with and governed by Tu, "thou" (understood). Misceo, miscere, mixtum and mistum.	Mix or Mix thou.
sol. (solutio).	Fem. noun, 3d decl. nom. sing. governing fiat. Solutio, -onis.	Let a solution.
ft. (fiat).	Trans. verb, pres. subj. 3d pers. sing. passive. Used as imperative governed by and agreeing with solutio. Fio, factus sum, fieri.	be made.

Capiat cochleare unum parvum tertia quaqua hora ex paulo aqua.

Cap. (capiat).	Irreg. trans. verb, subjunct. mood, pres. tense, 3d pers. sing. agreeing with and governed by Is, "he" (understood). Capio, capere, cepi, ceptum.	He may take or Let him take.
i (unum).	Num. adj. acc. sing. neut. qualifying and agreeing with cochleare. Unus, -a, -um.	one.
parv. (parvum).	Adj. acc. sing. neut. qualifying and agreeing with cochleare. Parvus, -a, -um.	small.
cochl. (cochleare).	Neut. noun, 3d decl. acc. sing. direct object of verb capiat. Cochleare, -is.	spoonful.
q.q. (quaqua).	Indef. pronoun, abl. sing. qualifying and agreeing with hora. Quisque, quæque, quodque.	every.
ter. (tertia).	Num. adj. abl. sing. qualifying and agreeing hora. Tertius, -a, -um.	third.
hora.	Fem. noun, 1st decl. abl. sing.	hour.
ex.	Preposition.	out of.
paul. (paulo).	Adj. abl. sing. agreeing with aqua.	a little.
aq. (aqua).	Fem. noun, 1st decl. abl. sing. after the preposition ex.	water.

PRINCIPLES OF MEDICAL COMBINATION

In writing prescriptions containing two or more ingredients, the writer should have a clear idea of what is to be accomplished, and of the physiological action of the drugs used. As a rule, no more drugs should enter into a prescription than are essential for the relief of given

conditions or symptoms. The use of over four or five ingredients is usually an indication that the prescriber is ignorant of their physiological action. The more thoroughly the prescriber knows the physiological action of drugs the simpler will be his prescriptions.

There are certain essential points to be remembered: A drug slow in action and prolonged in its influence should not be combined with one quickly acting and fleeting in its effects; preferably prescribe them separately and direct the patient to take them at intervals corresponding with the rapidity of their action and the needs of the patient.

By combining two or more ingredients in the same prescription several conditions may be fulfilled:

1. The *combined* or *joint action* of several drugs may be obtained. This may be illustrated by the administration of squill and digitalis for the relief of dropsy. Squill causes an increase of urinary flow mainly by stimulation of the secreting epithelium of the kidney, while digitalis increases the flow of urine by increasing the blood supply of the kidney. In certain cases the combination of these two remedies produces more prompt results than would be obtained by the use of either one singly.

The administration of aconite and digitalis in the same prescription illustrates what is known as *the crossed action of drugs*. When these are used together for the relief of cardiac palpitation, the combined or crossed action is represented in the slowing and steadying of the heart's action by stimulation of the pneumogastric centres by both drugs, while the depressing effect of aconite on the heart muscle and vasomotor system is counterbalanced by the stimulant effect of digitalis upon these portions of the body.

2. *Several symptoms may be combated.* In the early stages of an acute infectious disease there is usually fever, a full bounding pulse, and scanty urinary flow. Under these circumstances the combination of tincture of aconite is indicated to quiet the circulation and fever, with spirit of nitrous ether and solution of potassium citrate to increase the flow of the urine and also to aid in reducing the fever.

3. *The effect of another drug may be modified.* This is well illustrated by combining an antispasmodic drug, such as belladonna, hyoscyamus, or stramonium, with a purgative drug to prevent griping.

4. *New compounds may be formed.* The combination of lead acetate with zinc sulphate in water results in the formation of lead sulphate and zinc acetate, the lead sulphate being the new substance desired to act as an astringent to inflamed mucous membranes.

5. *Preparations may be rendered more agreeable to the taste.* This is particularly necessary in children to whom it is impossible to administer pills, capsules, or cachets, as they are unable to swallow them. The vehicle selected should be one in which the other ingredients are soluble, and it should have little or no medicinal action in itself.

6. *An effect may be obtained which is not marked by either drug when used singly.* The best example of this is in the combination of opium and ipecac to produce sweating.

7. *They may act as preservatives.* The addition of boric acid or salicylic acid or similar substances to solutions of alkaloids or to syrups to prevent fermentation.

8. *Chemical changes in any of the ingredients may at times be prevented.* The addition of tartaric acid to solutions of salts of quinine intended for hypodermic medication, to prevent precipitation of quinine by the alkaline tissues of the body, is an illustration.

INCOMPATIBILITY

Incompatibility may be defined as a condition arising when two or more substances are mixed as a result of physical dissociation, chemical change, or therapeutic antagonism.

It will be seen from the definition that there are three forms of incompatibility: Physical, sometimes called pharmaceutical; chemical; and therapeutic, sometimes called physiological.

Physical Incompatibility.—Physical incompatibility arises from disregard of the solubility of the various ingredients. In this form the ingredients undergo physical changes, producing unsightly preparations, although being unaltered chemically. The two most important solvents used in medicine are water and alcohol. It should be remembered that *water* is the best solvent for gums, sugar, starch, alkaloidal salts, extractives, gelatin, and albuminous bodies. These are insoluble in alcohol and are precipitated by its addition or by solutions containing it. *Alcohol* dissolves resins, oleoresins, balsams, volatile oils, camphoraceous substances, alkaloids, and glucosides. These alcoholic solutions are precipitated by the addition of water or by watery solutions of drugs.

Common physical or pharmaceutical incompatibilities are:

Acacia.—This is nearly insoluble in alcohol. When alcohol or strong alcoholic liquids are added to mucilage of acacia in sufficient quantity to make the mixture contain about 50 per cent. alcohol, the acacia is precipitated.

Acids.—These precipitate glycyrrhizin from liquid preparations of glycyrrhiza.

Aromatic Waters.—Aromatic waters should not be used to make saturated solutions of drugs, as the volatile principles are thrown out of solution and the preparation becomes cloudy.

Egg Albumin.—This is precipitated from its aqueous solution by the addition of alcohol, ether, collodion, resorcinol, camphor, thymol, and volatile oils.

Emulsions.—Emulsions are "cracked" by the addition of alcohol or alcoholic liquids.

Oleoresins, Fluidextracts, and Tinctures.—Those which contain resinous substances are precipitated by the addition of water or aqueous liquids.

Phenol.—Phenol (carbolic acid) is insoluble in water in proportions greater than 1 part of phenol to 20 parts of water. Larger proportions than this will show an excess of the drug at the bottom of the bottle. Phenol coagulates albumin and collodions.

Spirits.—Spirits containing volatile liquids or solids become cloudy upon the addition of water or aqueous liquids. The exceptions to this rule are: Spirit of ether, spirit of nitrous ether, spirit of ammonia, brandy, and whisky.

EXAMPLES.—Examples of pharmaceutical incompatibility:

℞—Emulsi olei morrhuæ . . . . . f℥iv.
Spiritus vini gallici . . . . . f℥ij.
Sig.—One tablespoonful t. i. d. after meals.

Brandy contains a large percentage of alcohol, which causes the oil and water to separate into layers, producing what is known as a "cracked emulsion."

℞—Tincturæ cannabis indicæ . . . . . f℥vj.
Syrupi . . . . . q. s. ad f℥iij.
Sig.—One teaspoonful every four hours.

The water in the syrup would cause precipitation of resinous matter from the tincture.

℞—Spiritus camphoræ. . . . . f ℥j.
Aquæ cinnamomi . . . . . q. s. ad f ℥iij.
Sig.—One teaspoonful every hour until relieved.

A preparation of this sort would be cloudy, due to the separation of camphor from its alcoholic solution upon the addition of cinnamon water.

℞—Oleoresinæ aspidii . . . . . f ℥ij.
Aquæ menthæ piperitæ . . . . . q. s. ad f ℥iv.
Sig.—One tablespoonful night and morning.

Oleoresin of aspidium is insoluble in peppermint water; by the addition of acacia or tragacanth an emulsion may be prepared.

℞—Tincturæ benzoini . . . . . f ℥iss.
Mucilaginis acaciæ . . . . . q. s. ad f ℥iij.
Sig.—One teaspoonful every four hours.

The strongly alcoholic tincture would precipitate acacia from the mucilage, while the benzoin would also be precipitated by the water in the mucilage.

℞—Tincturæ benzoini . . . . . f ℥vj.
Tincturæ gentianæ compositæ . . . . . q. s. ad f ℥iij.
Sig.—One teaspoonful every three hours.

The menstruum used in making the compound tincture of gentian contains a large percentage of water, which would cause the separation of the benzoin from its strong alcoholic solution.

℞—Fluidextracti cannabis indicæ . . . . . f ℥ss.
Aquæ camphoræ . . . . . q. s. ad f ℥iij.
Sig.—One teaspoonful every two hours.

The resin contained in the fluidextract of cannabis indica would be precipitated by the camphor water.

℞—Potassii iodidi . . . . . ℥j.
Aquæ menthæ piperitæ . . . . . q. s. ad f ℥j.
Sig.—Ten drops in water after meals, and gradually increase.

Peppermint water is a saturated solution of oil of peppermint in distilled water; if an attempt is made to saturate the liquid with a soluble salt, the oil would be thrown out of solution, causing the preparation to become cloudy.

℞—Quininæ sulphatis . . . . . ℥j.
Fluidextracti glycyrrhizæ . . . . . f ℥j.
Acidi sulphurici aromatici . . . . . f ℥ss.
Syrupi . . . . . q. s. ad f ℥iij.
Sig.—One dessertspoonful every three hours.

In this prescription the aromatic sulphuric acid is intended to render the quinine sulphate more soluble, but it also precipitated the sweet principle, glycyrrhizin, so that the object of using the fluidextract of licorice to disguise the taste of the quinine is entirely defeated.

Chemical Incompatibility.—Chemical incompatibility is that form in which the ingredients undergo chemical change, a new chemical compound being formed. This form of incompatibility is the most important, because it is the most dangerous, as poisonous compounds may be formed which may cause the death or serious injury of the patient if taken internally. In some instances the resulting compound is explosive. Chemical incompatibility may be detected: (1) By precipitation or the formation of insoluble compounds; (2) by effervescence, or the evolution of gases, (3) by change in color.

Chemical incompatibility may be intentional or unintentional.

Intentional incompatibility may be represented by the following:

℞—Plumbi acetatis . . . . . ℥ss.
Zinci sulphatis . . . . . gr. xv.
Aquæ rosæ . . . . . f ℥iv.
Misce.
Sig.—Use as an injection.

In this prescription, double decomposition takes place, lead sulphate is precipitated and is the substance desired, while zinc acetate remains in solution.

The following list contains some of the most important incompatibilities:

Acetates.—These are incompatible with mineral acids. Potassium acetate in solution produces an effervescence when mixed with spirit of nitrous ether.

Acetic Acid.—This decomposes nearly all carbonates, liberating carbon dioxide and forming acetates.

Acetphenetidin.—Acetphenetidin (phenacetin) is incompatible with strong oxidizing agents, such as chromium trioxide, chlorine, iodine, nitric acid, etc. It forms a liquid when triturated with phenol or hydrated chloral.

Acids.—Acids enter into chemical combinations with alkaloids, alkalies, alkaline salts, hydroxides, and oxides. With carbonates they cause effervescence, with the liberation of carbon dioxide. They all precipitate albumin. Mineral acids displace the weaker organic acids from their salts, and these may be thrown out of solution. Undiluted mineral acids should not be mixed with alcohol or strong alcoholic liquids, such as fluidextracts and tinctures, because of the danger of explosion through the formation of ethers.

Alcohol.—Alcohol precipitates albumin, acacia, and many inorganic salts from their aqueous solution. It is incompatible with strong mineral acids, hydrated chloral, mercuric chloride, and acid solutions of chromium trioxide, chromates, and potassium permanganate.

Alkaline Carbonates.—These should not be mixed with acids and acidulated liquids, such as syrup of squill and syrup of ipecac. They precipitate alkaloids from aqueous solutions of their salts.

Alkaloidal Salts.—These are precipitated by alkalies, alkaline carbonates, soluble bromides and iodides, and tannic acid.

Alum.—In solution, alum is precipitated by alkaline hydroxides, carbonates, and phosphates, borax, lime water, tannic and tartaric acids.

Antimony and Potassium Tartrate (Tartar Emetic).—This is incompatible with acids, alkaline hydroxides and carbonates, lime water, strong alcohol, tannic acid, gallic acid, mercuric chloride, lead acetate, silver nitrate, albumin, and soap.

Antipyrine.—Antipyrine is incompatible with calomel, chromium trioxide (chromic acid), Donovan's solution, iodine, potassium permanganate, solution of mercuric chloride, spirit of nitrous ether, tannic acid, and tincture of ferric chloride. When triturated with betanaphthol, ethyl carbamate (urethane), hydrated chloral, phenol, phenyl salicylate (salol), resorcinol, sodium salicylate, and thymol, a liquid or soft mass is produced.

Arsenic Trioxide (Arsenous Acid).—This is incompatible with ferric hydrate and solutions of dialyzed iron.

Fowler's solution is precipitated by lime water, tannic acid, ferric hydrate, solutions of dialyzed iron, and, being alkaline, may precipitate solutions of alkaloidal salts, and other neutral salts.

Benzaldehyde.—This is readily oxidized by the air and by oxidizing agents. It is incompatible with ammonia water, also with phenol and resorcinol in the presence of hydrochloric acid.

Benzoic Acid.—Benzoic acid is incompatible with alkaline hydroxides, calcium hydroxide and carbonate. Soluble *benzoates* precipitate nearly neutral solutions of ferric salts. *Sodium benzoate* is incompatible with solutions of salts of lead, mercury, and silver, also with solutions of quinine bisulphate and slightly acidulated solutions of quinine sulphate.

Betanaphthol.—In aqueous solution betanaphthol is incompatible with ferric chloride, chlorinated lime, and potassium permanganate. With antipyrine, camphor, phenol, menthol, or ethyl carbamate (urethane) it forms a liquid or soft mass.

Bismuth Subgallate.—This is decomposed by strong mineral acids.

Bismuth Subnitrate.—In the presence of water bismuth subnitrate is incompatible with alkaline carbonates and bicarbonates. It is also incompatible with soluble iodides, hypophosphites, and in mixture with tannic acid.

Bromides.—Bromides are incompatible with solutions of salts of lead, silver, mercury and the salts of some alkaloids.

Camphor.—A liquid or soft mass is produced when camphor is triturated with about an equal weight of betanaphthol, ethyl carbamate (urethane), hydrated chloral, menthol, phenol, phenyl salicylate (salol), thymol, and resinous substances.

Carbonates.—Acids and some metallic acid salts decompose carbonates with the liberation of carbon dioxide. Alkaline carbonates precipitate alkaloidal salts and metallic salts from their solutions.

Chromium Trioxide (Chromic Acid).—This may cause an explosion when mixed with strong alcohol, glycerin, ether, or volatile oils and when triturated with sugar, tannic acid, or other readily oxidizable substances.

Cocaine Hydrochloride.—This is subject to the incompatibilities mentioned under alkaloids. It should not be combined in solution with borax or zinc sulphate, as precipitation will occur.

Corrosive Mercuric Chloride (Corrosive Sublimate).—This is incompatible with arsenites in alkaline solution, lime water, alkaline carbonates, sulphides, soluble bromides and iodides, albumin, alkaloidal salts, tannic acid, and many other substances. With potassium iodide, a precipitate of red mercuric iodide is formed which is redissolved if the iodide is in excess. Corrosive sublimate should usually be prescribed alone.

Creosote.—Creosote may cause an explosion when triturated with silver oxide and strong oxidizing agents. It is incompatible with solutions of ferric salts.

Ethyl Carbamate (Urethane).—A liquid is produced when ethyl carbamate is triturated with antipyrine, camphor, phenol, hydrated chloral, menthol, betanaphthol, pyrogallol, resorcinol, salicylic acid, phenyl salicylate (salol), thymol, or benzoic acid.

Ferric Salts and Their Solutions.—These are incompatible with alkaline hydroxides, carbonates, phosphates, and sulphides, tannic and gallic acids, and borax. The tinctures of calumba, chirata, and quassia may be mixed with ferric salts or solutions, as they contain no tannic acid.

Ferrous Salts and Their Solutions.—These are incompatible with alkaline hydroxides, soluble carbonates, phosphates, and sulphides, tannic and gallic acids, and neutral solutions of borax.

Fluidextracts and Tinctures.—When they contain alkaloids they are incompatible with soluble iodides, alkaline carbonates, lime water, and tannic acid. Those containing tannin are incompatible with tincture of ferric chloride or ferric salts.

Formaldehyde Solution.—This solution is incompatible with the preparations of ammonia, hydrogen dioxide, water, bisulphites. It coagulates solutions of gelatin and reduces the salts of gold and alkaline solutions of salts of copper and silver.

Gallic Acid.—Gallic acid precipitates from solution antimony and potassium tartrate, iron salts, lead acetate, and reduces salts of silver and gold. It is also incompatible with potassium permanganate, spirit of nitrous ether, and lime water.

Glucosides.—These are decomposed by prolonged contact with mineral acids, alkalies, hot water, or ferments. They are precipitated by tannic acid.

Glycerin.—An explosion is caused when glycerin is triturated with oxidizing agents, such as chlorates, chromates, including chromium trioxide, and bichromates, hydrogen dioxide water, nitric acid, nitrohydrochloric acid, and potassium permanganate. A mixture of a chlorate, such as potassium chlorate, triturated with tincture of ferric chloride and glycerin without water is also explosive.

Guaiacol.—Guaiacol is incompatible with acids, ferric chloride, gold chloride, and silver nitrate.

Hydrated Chloral.—Hydrated chloral is incompatible with alkaline hydroxides and carbonates, ammonia, borax, potassium cyanide, iodide, and permanganate. It gives a liquid or soft mass when triturated with acetanilide, acetphenetidin, antipyrine, camphor, menthol, monobromated camphor, phenol, phenyl salicylate (salol), sodium phosphate, sulphonmethane, sulphonethylmethane, thymol, and ethyl carbamate (urethane). If dissolved in a hydro-alcoholic liquid along with potassium or sodium bromide it forms chloral alcoholate, which separates as an oily liquid.

Hydrobromic Acid and the Soluble Bromides.—Solutions of salts of silver, lead, and mercurous compounds are precipitated as bromides by these.

Hydrochloric Acid and the Soluble Chlorides.—These precipitate solutions of salts of silver, lead, and mercurous compounds as chlorides. It is incompatible with tartar emetic and with salts of weak or organic acids.

Hydrocyanic Acid, Dilute, and the Soluble Cyanides.—These precipitate solutions of salts of silver, lead, mercurous compounds, and the alkaloids.

Iodides.—Iodides are incompatible with mineral acids, metallic and alkaloidal salts in solution, spirit of nitrous ether, or nitrites in acid solution, and hydrogen dioxide.

Iodine.—Iodine is incompatible with alkaloids, fixed alkaline hydroxides or carbonates, ammonia water, metallic salts, nitric acid, and starch.

Iodoform.—Iodoform is incompatible with silver nitrate, tannin, and with calomel and fatty substances when exposed to the light.

Iodol.—Iodol should not be triturated with mercuric oxide, as an explosion may result.

Lead Acetate and Subacetate.—In aqueous solution these are precipitated by fixed alkaline hydroxides, bromides, carbonates, chlorides, iodides, sulphates, sodium phosphate, borax, nitric and sulphuric acids, and tannic acid. It gives a precipitate with alkaloids and glucosides, and a liquid or soft mass is formed when it is triturated with ethyl carbamate, phenol, resorcinol, salicylic acid, sodium phosphate, and salicylate.

Magnesium Sulphate.—This is incompatible with the alkaline hydroxides and the hydroxides of barium, calcium, and strontium, alkaline phosphates, such as sodium phosphate; with phenol it forms magnesium phenolsulphonate.

Menthol.—A liquid or soft mass is formed when menthol is triturated with camphor, hydrated chloral, betanaphthol, phenol, resin, resorcinol, thymol, or ethyl carbamate (urethane). It is also incompatible with chromium trioxide, nitric acid, and potassium permanganate in solution.

Mild Mercurous Chloride (Calomel).—This is incompatible with soluble bromides, iodides, chlorides, and cyanides, antipyrine, bromine, chlorine, iodine, nitric and nitrous acids, spirit of nitrous ether, hydrocyanic acid, and lime water.

Corrosive Mercuric Chloride (Corrosive Sublimate).—Corrosive mercuric chloride is incompatible with arsenites in alkaline solution, lime water, alkaline carbonates, sulphides, soluble bromides and iodides, albumin, alkaloidal salts, tannic acid, and many other substances. In solution with potassium iodide a precipitate of red mercuric iodide is formed, which is redissolved if the iodide is in excess. Corrosive sublimate should usually be prescribed alone.

Methylthionine Hydrochloride (Methylene Blue).—This is incompatible with potassium iodide and bichromate in aqueous solution, and with sulphuric acid.

Monobromated Camphor.—When triturated with hydrated chloral, phenol, phenyl salicylate (salol), or thymol, monobromated camphor gives a liquid or soft mass.

Naphthalene.—Naphthalene is incompatible with nitric acid, and when triturated with phenol or phenyl salicylate it produces a liquid.

Nitric Acid.—This may cause explosions when mixed with alcohol or strong alcoholic liquids, creosote, glycerin, volatile oils, and other organic substances.

Nitrohydrochloric Acid.—Explosives are formed with glycerin and all organic matter.

Phenol (Carbolic Acid).—Collodion and aqueous solutions of albumin are coagulated. With soluble sulphates it forms phenolsulphonates. It is oxidized by hydrogen dioxide, nitric acid, and potassium per-

manganate. Crystalline phenol gives a liquid or soft mass when triturated with acetanilide, antipyrine, camphor, monobromated camphor, hydrated chloral, lead acetate, menthol, thymol, acetphenetidin, resorcinol, phenyl salicylate (salol), sodium phosphate, terpin hydrate, and ethyl carbamate.

Phenyl Salicylate (Salol).—A liquid or soft mass is formed when phenyl salicylate is triturated dry with camphor, monobromated camphor, phenol, hydrated chloral, thymol, sulphonethylmethane (trional), and ethyl carbamate.

Potassium Chlorate and Other Chlorates.—These are liable to cause an explosion when triturated dry or heated with sulphur, sulphides, hyposulphites, hypophosphites, tannic acid or substances containing it, gallic acid, sugar, glycerin, and other readily oxidizable substances. It is also incompatible with mineral acids, potassium iodide, and syrup of ferrous iodide. If triturated with ammonium chloride in the dry state, the preparation may take fire.

Potassium Permanganate.—Potassium permanganate is incompatible with sulphur, sulphides, hyposulphites, charcoal, sugar, glycerin, alcohol, tannic acid, oxalic acid, picric acid, fats, oils, gums, and other readily oxidizable substances, as an explosion is likely to result when they are triturated together. This drug should be given alone, preferably in pill form, using petrolatum or oil of theobroma as the excipient.

Pyrogallol.—Pyrogallol is incompatible with ammonia, lead acetate, lime water, solutions of ferrous sulphate, ferric acetate, and chloride. It reduces salts of gold, mercury, and silver in aqueous solution. When triturated with antipyrine, camphor, menthol, phenol, or ethyl carbamate (urethane) it produces a liquid.

Resorcinol.—Resorcinol is incompatible with solution of ferric chloride, nitrous acid, or spirit of nitrous ether. A liquid or soft mass is formed when it is triturated with acetanilide, antipyrine, camphor, menthol, phenol, and ethyl carbamate.

Salicylic and Soluble Salicylates.—These are incompatible with ferric salts.

Santonin.—With sodium bicarbonate santonin forms soluble sodium santoninate. It is subject to the incompatibilities of glucosides.

Silver Nitrate Solutions.—These should always be made with distilled water. In pill form it is best combined with the extract of opium or the extract of hyoscyamus. With other drugs it is incompatible and should not be combined because of the rapidity with which it is oxidized.

Silver Oxide.—This readily parts with its oxygen, forming explosive compounds with organic and readily oxidizable substances, such as sulphur, sulphides, tannic acid, etc.

Sodium Borate (Borax).—In saturated solution sodium borate gelatinizes mucilage of acacia. It precipitates alkaloid and metallic compounds from solutions of their salts. It is incompatible with glycerin and honey.

Spirit of Nitrous Ether.—This is incompatible with ammonium bromide and iodide, sodium and potassium iodide, antipyrine, acetanilide, morphine, phenol, thymol, tincture of guaiac, and tannic acid.

Sulphonethylmethane (Trional).—This liquefies when triturated with hydrated chloral and phenyl salicylate (salol).

Sulphonmethane (Sulphonal).—This liquefies when triturated with hydrated chloral.

Sulphur.—Sulphur should not be triturated dry with strong oxidizing agents, such as potassium chlorate or permanganate, chromium trioxide (chromic acid), and nitric acid.

Sulphuric Acid and the Soluble Sulphates.—These precipitate solutions of the salts of lead, barium, calcium, and strontium as sulphates. Sulphuric acid forms explosive mixtures with alcohol and strong alcoholic liquids. When concentrated it carbonizes organic matter.

Syrups.—Syrups are carbonized upon the addition of concentrated sulphuric acid. Strong alcohol or alcoholic liquids cause sugar to crystallize out of solution.

Tannic Acid.—In solution, tannic acid precipitates alkaloids, alkaloidal salts, and the salts of antimony, bismuth, lead, silver, and mercury. It precipitates albumin, some glucosides, and antipyrine from aqueous solution. If triturated with potassium chlorate or other substances which yield oxygen readily it may cause an explosion.

Thymol.—Thymol is incompatible with spirit of nitrous ether and chromium trioxide (chromic acid). It gives a liquid or soft mass when triturated with acetanilide, antipyrine, camphor, monobromated camphor, hydrated chloral, menthol, phenol, quinine sulphate, phenyl salicylate, and ethyl carbamate.

Zinc Salts.—Zinc salts are precipitated by soluble carbonates, phosphates, arsenates or cyanides, borax, and tannic acid. They coagulate albumin.

Examples of Chemical Incompatibility.

℞—Acidi hydrochlorici . . . . . f ℥j.
Tincturæ gentianæ compositæ . . . . . q. s. ad f ℥iij.
Misce.
Sig.—One teaspoonful in water after meals.

The strong acid would react with the alcohol in compound tincture of gentian to form ethers which might cause an explosion if the bottle were tightly corked.

℞—Ammonii carbonatis,
Ammonii chloridi . . . . . āā gr. xxx.
Syrupi scillæ . . . . . f ℥j.
Aquæ . . . . . q. s. ad f ℥ij.
Misce.
Sig.—One-half a teaspoonful as required.

Syrup of squill contains acetic acid, which would react with ammonium carbonate, forming ammonium acetate and liberating carbon dioxide, the pressure of which may burst the bottle if tightly corked.

℞—Sodii boratis . . . . . gr. x.
Zinci sulphatis . . . . . gr. j.
Aquæ camphoræ . . . . . f ℥j.
Aquæ rosæ . . . . . q. s. ad f ℥j.
Misce.
Sig.—One drop in each eye night and morning.

The zinc is precipitated by the borax as zinc borate.

℞—Antipyrinæ . . . . . gr. xx.
Hydrargyri chloridi mitis. . . . . gr. x.
Sodii bicarbonatis . . . . . ℥j.
Misce et fiant chartulæ No. xx.
Sig.—One every three hours.

In the presence of moisture this mixture turns gray, due to the formation of metallic mercury and mercurous oxide. Mercuric chloride is also formed.

℞—Quininæ sulphatis . . . . . gr. xx.
Potassii acetatis . . . . . gr. xl.
Acidi sulphurici aromatici . . . . . ♏viii.
Aquæ cinnamomi . . . . . q. s. ad f ℥ij.
Misce.
Sig.—One teaspoonful after meals.

In this prescription a voluminous precipitate of quinine acetate is formed which cannot be poured from the bottle.

℞—Codeinæ sulphatis . . . . . gr. xii.
Ammonii bromidi . . . . . ℥ss.
Aquæ . . . . . q. s. ad f ℥iij.
Misce.
Sig.—One teaspoonful at bedtime.

Double decomposition takes place, resulting in such an abundant precipitate that the preparation cannot be poured.

℞—Antipyrinæ,
Sodii salicylatis . . . . . āā gr. xxx.
Misce et fiant chartulæ No. xv.

After a time this preparation liquefies, especially in a moist atmosphere.

℞—Tincturæ aconiti . . . . . ♏xx.
Antipyrinæ . . . . . ℥j.
Spiritus ætheris nitrosi . . . . . f ℥j.
Elixiris aromatici . . . . . q. s. ad f ℥ij.
Misce.
Sig.—One teaspoonful every four hours.

Antipyrine with sweet spirit of nitre produces a green color due to the formation of isonitroso antipyrine. The change sometimes takes place very slowly.

℞—Argenti nitratis . . . . . gr. xx.
Sodii chloridi . . . . . gr. x.
Aquæ . . . . . f ℥vi.
Misce.
Sig.—Five drops in each eye night and morning.

Silver nitrate is precipitated as silver chloride, which is insoluble.

℞—Cocainæ hydrochloridi . . . . . gr. v.
Sodii boratis . . . . . gr. ij.
Aquæ destillatæ . . . . . f ℥j.
Misce.
Sig.—One drop in the right eye at night.

Borax is alkaline in reaction and precipitates the alkaloid cocaine from the solution of its salt.

℞—Strychninæ sulphatis . . . . . gr. ss.
Potassii iodidi . . . . . ℥iij.
Aquæ . . . . . q. s. ad f ℥iv.
Misce.
Sig.—One teaspoonful three times a day.

Alkaloids and alkaloidal salts are precipitated by soluble iodides. In this case, iodide of strychnine is precipitated, and, unless the bottle is shaken, the patient may be poisoned by taking all the strychnine in the last dose.

℞—Quininæ bisulphatis . . . . . ℥ss.
Liquoris ferri et ammonii acetatis . . . . . f ℥ij.
Misce.
Sig.—One teaspoonful every four hours.

Insoluble quinine acetate is precipitated, and the liquor is partially decolorized.

℞—Chromii trioxidi,
Glycerini,
Alcoholis . . . . . āā ℥j.
Misce.
Sig.—Apply as directed.

This is inflammable and explosive, owing to the powerful oxidizing agent, chromium trioxide.

℞—Tincturæ ferri chloridi . . . . . f ℥ij.
Tincturæ gentianæ compositæ . . . . . q. s. ad f ℥iv.
Misce.
Sig.—One teaspoonful after meals.

Gentian contains tannic acid, which forms black tannate of iron with the tincture of ferric chloride.

℞—Hydrargyri chloridi corrosivi . . . . . gr. j.
Potassii iodidi . . . . . ℥ss.
Quininæ bisulphatis . . . . . ℥j.
Syrupi . . . . . f ℥j.
Aquæ . . . . . f ℥iij.
Misce.
Sig.—One teaspoonful three times a day.

Potassium iodide precipitates red mercuric iodide, but this redissolves in excess of potassium iodide, forming potassio-mercuric iodide which precipitates all alkaloids from their solutions.

Therapeutical or Physiological Incompatibility.—Therapeutical incompatibility is that form in which a prescription contains ingredients which are directly antagonistic to each other in action. This action may be confined to one portion of the body or to one organ only, while on other portions of the body their action may be similar. Much depends upon what is the action desired. To administer aconite and digitalis in the same prescription with the object of obtaining either stimulation or depression of the heart would be useless, as the one would neutralize the effects of the other. If, however, it were desired to slow or steady the heart's action without influencing the force of the cardiac contraction, these two drugs in combination could not be considered therapeutically incompatible.

As a rule, drugs which influence similar portions of the system antagonistically should not be combined in the same prescription. Thorough knowledge of the physiological action of remedies is necessary in order to avoid therapeutical mistakes.

WEIGHTS AND MEASURES

The system of weights and measures commonly employed by physicians and pharmacists in the United States is the Apothecaries' or Troy weights, and Apothecaries' or Wine Measure.

The metric or decimal system of weights and measures was legalized in the United States in 1866, but its use was not made compulsory. Of late years its use has increased, and, in the Eighth Decennial Revision of the *United States Pharmacopœia*, weights and measures are expressed in the metric system except where only relative values are stated, when the proportions are expressed in parts by weight or by volume.

ENGLISH WEIGHTS

Table of Apothecaries' or Troy Weight.

Pound (Libra).	Ounce (Uncia).	Dram (Drachma).	Scruple (Scrupulus).	Grain (Granum).
lb. 1	12	96	288	5760
	℥1	8	24	480
		ʒ1	3	60
			℈1	gr. 20

The Avoirdupois weight has been adopted for use in the British Pharmacopœia, and it is also in general use in the United States for commercial purposes.

Table of Avoirdupois Weight.

Pound (Libra).	Ounce (Uncia).	Grain (Granum).
lb. 1	16	7000
	oz. 1	gr. 437.5

The Avoirdupois pound contains 16 ounces of 437.5 grains each; the Apothecaries' pound contains 12 ounces of 480 grains each.

The abbreviations or signs for the two systems differ materially and care should be exercised not to confound them. The Apothecaries' weights are represented by the signs, lb. pound, ℔ ounce, ℥ dram, ℈ scruple, and gr. grain; this latter should always be written with a small initial. The numerals indicating the number of weight units to be taken are always placed after the sign or symbol designating the unit, and in Roman characters, thus: gr. x; ℥iv; ℥iiss; ℔iv.

Avoirdupois weights are represented by the signs, lb. pound; oz. ounce; gr. grain.

ENGLISH MEASURES

Table of Apothecaries' or Wine Measure.

Gallon (Congius).	Pint (Octarius).	Fluidounce (Fluiduncia).	Fluidram (Fluidrachma).	Minim (Minimum).
Cong. 1	8	128	1024	61440
	O. 1	16	128	7680
		f℥ 1	8	480
			f℥ 1	♏ 60

Table of Imperial Measure (Adopted by the British Pharmacopœia).

Gallon (Congius).	Pint (Octarius).	Fluidounce (Fluiduncia).	Fluidram (Fluidrachma).	Minim (Minimum).
Cong. 1	8	160	1280	76800
	O. 1	20	160	9600
		fl. oz. 1	8	480
			fl. dr. 1	min. 60

The differences between these two measures are the following:

The Apothecaries' pint contains 16 fluidounces, while the Imperial pint contains 20 fluidounces; the *weight* of the Imperial fluidounce is the same as the Avoirdupois ounce, 437.5 grains, while the Apothecaries' fluidounce weighs 456.39 grains.

In approximating doses of a liquid for a patient, the following quantities have been established:

A tumblerful	f℥viij.	A tablespoonful	f℥iv.
A teacupful	f℥iv.	A dessertspoonful	f℥ij.
A wineglassful	f℥ij.	A teaspoonful	f℥j.

A drop is erroneously supposed to be 1 minim. The size of a drop depends upon the temperature of the liquid, the shape of the vessel from which it is dropped, and upon the viscidity of the liquid. Tinctures, spirits, and other alcoholic liquids drop from 120 to 150 drops to the fluidram, while thick liquids, such as mucilages, glycerin, syrups, etc., drop less than 60 drops to the fluidram. Modern cups and spoons are, as a rule, greater in capacity than the quantities given above. For this reason accurately graduated medicine glasses should be used in measuring doses.

THE METRIC SYSTEM

The starting point of the Metric system is the unit of length, the Meter, abbreviated M., which is the one-forty-millionth part of the circumference of the earth around the poles, and is equivalent to 39.37 inches.

From the Meter, the unit of capacity, the Liter, L., is derived. This is the capacity of the cube of $\frac{1}{10}$ of a Meter, or one cubic decimeter. The unit of weight, the Gram, Gm., is also derived from the Meter, it being the weight of that quantity of water at its maximum density, 4° C. (39.2° F.), which would fill the cube of $\frac{1}{100}$ part of a Meter, or one cubic centimeter.

The subdivisions or multiples of the units are expressed by dividing and multiplying by the number 10. The successive multiples are designated by the Greek prefixes, Deka, 10; Hecto, 100; Kilo, 1000; Myria, 10,000, usually spelled with an initial capital letter. The subdivisions of the units are designated by the Latin prefixes, deci, $\frac{1}{10}$; centi, $\frac{1}{100}$; milli, $\frac{1}{1000}$; usually spelled with a small initial.

In expressing quantities by weight or by measure in the Metric system, the Arabic numerals are used and are always placed before the terms or abbreviations designating the units, thus: 20 millimeters; 1.50 Gm.; 20 Cc.

Table of Metric Lengths.

1 Myriameter,	Mm.	10000 Meters.	Meter,	M.	1 Meter.
1 Kilometer,	Km.	1000 Meters.	1 decimeter,	dm.	.1 Meter.
1 Hectometer,	Hm.	100 Meters.	1 centimeter,	cm.	.01 Meter.
1 Dekameter,	Dm.	10 Meters.	1 millimeter,	mm.	.001 Meter.

The English, approximate, equivalents of these are the following:
1 Meter is approximately 40 inches.
25 millimeters, or 25 mm., is 1 inch.

Table of Metric Capacities.

1 Myrialiter,	Ml.	10000 Liters.	Liter,	L.	1 Liter.
1 Kiloliter,	Kl.	1000 Liters.	1 deciliter,	dl.	.1 Liter.
1 Hectoliter,	Hl.	100 Liters.	1 centiliter,	cl.	.01 Liter.
1 Dekaliter,	Dl.	10 Liters.	1 milliliter,	ml.	.001 Liter.

In chemical and pharmaceutical practice the term cubic centimeter (Cc.) is used in place of milliliter. This and the Liter are the units most commonly employed.

Approximate English Equivalents

1 Liter,	= 1 quart.	4.0 Cubic centimeters	= 1fluidram.
1 Cubic centimeter,	= 15 minims.	30.0 Cubic centimeters	= 1fluidounce.
.06 Cubic centimeter,	= 1 minim.		

Table of Metric Weights.

1 Myriagram,	Mg.	10000 Grams.	Gram,	Gm.	1 Gram.
1 Kilogram,	Kg.	1000 Grams.	1 decigram,	dg.	.1 Gram.
1 Hectogram,	Hg.	100 Grams.	1 centigram,	cg.	.01 Gram.
1 Dekagram,	Dg.	10 Grams.	1 milligram,	mg.	.001 Gram.

Approximate English Equivalents.

1 Gram,	=	15 grains.	4.0 Grams	=	1 dram.
.06 Gram,	=	1 grain.	30.0 Grams	=	1 ounce.

Method of converting the Metric tables into the English equivalents and the English into the Metric equivalents.

When it is desired to transpose Metric into English equivalents, divide the Metric quantity by the Metric equivalent of the unit desired; thus, to convert 0.30 Gm. into grains, divide this quantity by the Metric equivalent of 1 grain or 0.06 Gm., which gives 5 grains.

When transposing the English into the Metric equivalents, multiply the quantity by the Metric equivalent of the unit desired; thus, to convert 20 grains into Grams, multiply this quantity by the Metric equivalent of 1 grain or .06 Gm., which gives 1.2 Grams.

PART II

OFFICIAL DRUGS AND CHEMICALS, ARRANGED ALPHABETICALLY

ACACIA—Acacia

Synonym, Gum Arabic. *Family,* Leguminosæ.

Acacia is a gummy exudate obtained from *Acacia senegal* and several other species of the acacia trees or shrubs growing in Africa. It is usually seen in roundish tears, or irregular fragments, varying in size from a pea to a walnut. The finest variety is white or colorless, while the inferior quality is reddish or amber colored; only the finest variety should be used in medicine and pharmacy. The gum is brittle, and may be readily broken into fragments by grinding or triturating, but its reduction to a fine powder is more difficult, it being necessary to dry it by the aid of heat before its pulverization can be accomplished. The gum has a faint odor, an insipid taste; it is slowly *soluble* in two parts of water, forming a thick mucilaginous liquid, but is insoluble in alcohol. Powdered and granulated acacia are the forms usually employed in prescriptions. Solutions of acacia in water or syrup ferment and become sour during warm weather, and should, therefore, be freshly prepared when wanted, during this season.

On account of its high price, powdered acacia is sometimes adulterated with flour or starch. These adulterations may be detected by making a solution of the suspected powder in boiling water, and, after cooling, adding a few drops of tincture of iodine; if starch or flour is present, the liquid will become purple in color.

Action and Uses.—Acacia is devoid of physiological action, but its solution in water is employed as a protective application to inflamed mucous membranes. In *pharyngitis,* the irritation may be somewhat allayed by dissolving fragments of the gum in the mouth; in *acute gastritis,* it may be administered to soothe the inflamed mucous membrane of the stomach. In *pharmacy* it is extensively employed in preparing *emulsions, mixtures, pills,* and *lozenges.* Oils and oleoresins may be emulsified and held suspended in water by its use; adhesiveness is given to *pill* and *troche masses* by it. When employed for the last-named purpose a solution of acacia in glycerin is to be preferred to the powder.

Incompatibilities.—Acacia in solution is precipitated by strong alcohol, and forms a gelatinous precipitate with lead subacetate, ferric salts, and concentrated solution of sodium borate. Ferrous salts in solution are slowly oxidized by it. With guaiac, liquid preparations containing acacia become bluish in color.

Official Preparations

Mucilago Acaciæ (*Mucilage of Acacia*).—Prepared by dissolving 34 Gm. of washed Acacia in 33 Gm. of Lime Water and enough Water to make 100 Gm. of mucilage.

Dose.—Any quantity.

Syrupus Acaciæ (*Syrup of Acacia*).—Prepared by dissolving, by the aid of heat 80 Gm. of Sugar in a freshly made solution of 10 Gm. of Acacia in 43 Cc. of Distilled Water.

Dose.—Any quantity.

ACETANILIDUM—Acetanilide

Synonym, Antifebrin. *Formula,* $C_8H_9NO.$ = 134.09.

A monacetyl derivative [$C_6H_5NH(CH_3.CO)$] of aniline, made by acting upon aniline by glacial acetic acid in the presence of heat, congealing and purifying the residue by sublimation and recrystallization. It appears as colorless, shining, micaceous, crystalline lamellæ, or as a crystalline powder, devoid of odor, and having a slightly burning taste. The chemical is neutral in reaction, permanent in air, sparingly soluble in water (1 in 179 parts), but freely *soluble* in alcohol (1 in 2.5 parts). Hydrated chloral renders it readily soluble in water.

Action and Uses.—Acetanilide in medicinal doses is a sedative to the nervous system, acting chiefly upon the sensory nerves and the sensory areas of the spinal cord; it actively reduces the temperature of *fever.* The drug is employed internally for the relief of *neuralgia,* and other nerve pains, to relieve the *pain of subacute rheumatism,* and to a limited extent to reduce temperature in fevers of a sthenic type. Being only sparingly soluble, and practically tasteless, the most suitable way of prescribing it is in powders.

Poisonous Effects.—In excessive doses, acetanilide gives rise to marked cyanosis, sweating, circulatory depression, respiratory depression, and general relaxation. When used habitually, or when long continued, there is mental hebetude, a progressive decrease in the red blood corpuscles, and congestion of the liver, kidney, and spleen.

Treatment of Poisoning.—If mild, the patient will probably recover without active treatment if put to bed and surrounded with blankets. Severe cases of poisoning call for the use of aromatic spirit of ammonia, strychnine, and atropine to overcome respiratory and circulatory depression, and oxygen by inhalation to overcome cyanosis and respiratory embarrassment.

Incompatibilities.—In solution, acetanilide, with spirits of nitrous ether, nitric acid, or acidified solutions of nitrites, produces a yellow color, which after a time becomes red; with tincture of ferric chloride it gives a red color; mineral acids hydrolize it; strong alkalies decompose it, setting free aniline; trituration with thymol or resorcinol forms a soft mass or liquid; heavy trituration with antipyrine produces a damp powder.

Dose.—0.06 to 0.3 Gm.; 1 to 5 grains.

Official Preparation

Pulvis Acetanilidi Compositus (*Compound Acetanilide Powder*).—Made by mixing together 7 Gm. of Acetanilide, 1 Gm. of Caffeine, and 2 Gm. of Sodium Bicarbonate.

Dose.—0.12 to 0.5 Gm.; 2 to 8 grains.

ACETONUM—Acetone

Synonym, Dimethylketone.

Acetone is a transparent, colorless, volatile, and mobile liquid, having a characteristic ethereal odor, and a pungent, sweetish taste. It is *miscible* in all proportions with water, ether, alcohol, chloroform, and volatile oils, and is a solvent for guncotton, camphor, volatile oils, resins, and fats. It volatilizes at a low temperature, is inflammable, and burns with a luminous, non-sooty flame, and therefore should be kept in well-closed vessels in a cool place remote from light and air. It may be made by distillation from dried calcium acetate, and should contain not less than 99 per cent. by weight of absolute Acetone ($CH_3.CO.CH_3$).

Action and Uses.—Acetone was admitted to the Pharmacopœia on account of its value as a solvent, and is now employed in the place of ether in the manufacture of oleoresins.

ACETPHENETIDINUM—Acetphenetidin

Synonym, Phenacetin. *Formula,* $C_{10}H_{13}NO_2 = 177.79$.

Acetphenetidin is a phenol derivative, $[C_6H_4(OC_2H_5).NH.CH_3.CO\ 1:4]$, made by treating paraphenacetin with glacial acetic acid. It occurs in white, glistening scales, or as a fine crystalline, odorless, and tasteless powder. It is *soluble* in 925 parts of water and in 12 parts of alcohol.

Action and Uses.—Like antipyrine and acetanilide, acetphenetidin is a sedative to the nervous system, depressing the sensory side of the spinal cord. In single, medicinal doses it has but little effect upon the circulation, only acting as a depressant in large and repeated doses.

Like acetanilide and antipyrine it actively reduces the temperature of fever. In overdoses it gives rise to cyanosis, circulatory depression, sweating, and general relaxation. The drug is used to relieve the *pain* of *neuralgia, sciatica, migraine, subacute rheumatism,* and *lumbago,* and to reduce *fever of a sthenic type.* This phenol derivative is less powerful in action and less toxic than either antipyrine or acetanilide. Being sparingly soluble, tasteless, and permanent in air, it is suitable for administration in powders and capsules.

Incompatibilities.—With spirit of nitrous ether, acetphenetidin slowly assumes a yellow color, later becoming brownish-red; trituration with phenol or hydrated chloral results in liquefaction; strong acids and alkalies decompose it.

Dose.—0.3 to 0.6 Gm.; 5 to 10 grains.

ACIDUM ACETICUM—Acetic Acid

A liquid, composed of not less than 36 per cent. by weight of absolute Acetic Acid, $CH_3.COOH = 59.58$, and about 64 per cent. of water, obtained by the destructive distillation of wood. It is clear, colorless, has a strong vinegar-like odor, a purely acid taste, a strong acid reaction, and is freely *miscible* with water and alcohol.

Acidum Aceticum Dilutum (*Diluted Acetic Acid*).—Contains 6 per cent. by weight of absolute acetic acid. Prepared by mixing together 100 Gm. of official acetic acid and 500 Gm. of water.

Acidum Aceticum Glaciale (*Glacial Acetic Acid*).—A liquid containing not less than 99 per cent. by weight of absolute acetic acid, and not more than 1 per cent. of water. It is clear, colorless, having a strong vinegar-like odor and a very pungent, acid taste. At a temperature somewhat below 15° C. (59° F.) the acid becomes a crystalline solid, hence its name. The acid is made by distillation from a mixture of anhydrous sodium acetate and concentrated sulphuric acid, and purified through cooling to the point of crystallization.

Action and Uses.—Of the three official forms of acetic acid, the only one used internally is diluted acetic acid, which corresponds in strength to good vinegar. Locally, it is used as a lotion for controlling *night sweats,* as a cooling and cleansing application for fever patients, and to control slight *hemorrhages,* such as *bleeding from the nose.*

It is a good solvent for alkaloids and many active principles, and is used as a *menstruum* in making the official liquid preparations known as Aceta, or vinegars. The salts of acetic acid are known as *acetates.*

Glacial acetic acid is highly toxic; its only medicinal uses are as an escharotic for removing warts, and for the destruction of unhealthy granulation upon old ulcers.

Incompatibilities.—Acetic acid unites with alkalies to form acetates; it decomposes carbonates and bicarbonates, liberating carbon dioxide. Vinegar of opium, vinegar of squill, syrup of squill (not compound

syrup of squill), all containing diluted acetic acid, are incompatible with ammonium carbonate and other carbonates and bicarbonates. The salts of acetic acid known as acetates are mostly soluble in water, and are decomposed by mineral acids, liberating acetic acid from combination.

Dose.—Diluted acetic acid, 2 to 4 Cc.; ½ to 1 f℥.

ACIDUM BENZOICUM—Benzoic Acid

Formula, $HC_7H_5O_2 = 121.13$.

Benzoic acid is an organic acid obtained from benzoin by sublimation, or prepared artificially. It occurs in white or yellowish-white, lustrous scales of friable needles, nearly odorless, or having the agreeable odor of benzoin, and an acid, pungent taste. It is *soluble* in 281 parts of water, in 1.8 parts of alcohol; volatilizes freely with the vapor of boiling water. With alkalies it forms *benzoates;* those of *ammonium, lithium,* and *sodium* being official.

Action and Uses.—Benzoic acid is eliminated in the urine as hippuric acid, rendering that secretion more strongly acid, or, if alkaline from pathological conditions, rendering it acid. It is used in *phosphaturia,* and many diseased conditions of the bladder to overcome *alkalinity of the urine.* Being sparingly soluble in water and quite bulky, it may be conveniently prescribed in cachets. On account of their greater solubility in water, the benzoates are, in some instances, preferred to the acid.

Incompatibilities.—Benzoic acid forms soluble compounds with alkali carbonates and bicarbonates, liberating carbon dioxide. The benzoates are transposed by mineral acids, liberating benzoic acid from chemical combination. They precipitate the salts of iron, lead, silver, mercury, and also quinine sulphate, and quinine bisulphate.

Dose.—0.5 to 2 Gm.; 7 to 30 grains.

Official Benzoates

Ammonii Benzoas (*Ammonium Benzoate*). *Formula,* $NH_4C_7H_5O_2 = 138.06$.—Ammonium benzoate is seen in thin, white, laminar crystals, or as a white crystalline powder, having a slight odor of benzoic acid, and a bitter, saline, slightly acrid after-taste. It is *soluble* in 10.5 parts of water, and 28 parts of alcohol. The salt should be neutral in reaction, but occasionally an acid salt is met with, which is far less soluble and does not fulfil the requirements of the Pharmacopœia. It is made by the action of benzoic acid upon ammonia water.

Action and Uses.—Ammonium benzoate when administered is eliminated in the urine as hippuric acid and nitric acid, thereby increasing the normal acidity of the urine, or overcoming alkalinity if present. In this respect its action is similar to benzoic acid. It is somewhat

less irritating to the stomach and more soluble than benzoic acid. It is best prescribed in cachets.

Incompatibilities.—The salt is decomposed by mineral acids, liberating benzoic acid. It precipitates the salts of iron, lead, silver, mercury, quinine sulphate, and quinine bisulphate.

Dose.—0.6 to 2 Gm.; 10 to 30 grains.

Lithii Benzoas (*Lithium Benzoate*). *Formula*, $LiC_7H_5O_2 = 127.11$.—Lithium benzoate occurs as a light, white powder, or small shining, crystalline scales; odorless, or of a faint, benzoin-like odor, and a cooling, sweetish taste. It is *soluble* in 3 parts of water, and 13 parts of alcohol. It is made by acting upon lithium carbonate with benzoic acid.

Action and Uses.—This soluble salt of benzoic acid, when taken internally, is eliminated in the urine as hippuric acid, increasing the rheumatism, acidity of the urine, or overcoming alkalinity, if present. It is used in treating *phosphaturia*, and to overcome alkalinity of the urine in *cystitis*. It may be *prescribed* in solution, capsules, or cachets.

Dose.—0.6 to 2 Gm.; 10 to 30 grains.

Sodii Benzoas (*Sodium Benzoate*). *Formula*, $NaC_7H_5O_2 = 143.01$.—A white, amorphous, granular, or crystalline powder, made by adding sodium bicarbonate to benzoic acid suspended in water, evaporating, and granulating. It is odorless, has a sweetish, astringent taste, is permanent in air, and *soluble* in 1.6 parts of water and 43 parts of alcohol. Its aqueous solution is neutral or slightly alkaline to litmus paper.

Action and Uses.—When taken internally, sodium benzoate is decomposed in the tissues and eliminated in the urine as hippuric acid, rendering that secretion more strongly acid than normal, or neutralizing any abnormal alkalinity. It is administered internally in the treatment of *phosphaturia*. It may be *dispensed* in powders, capsules, cachets, or in aqueous solution.

Incompatibilities.—The salt is decomposed by mineral acids, liberating benzoic acid. It precipitates the salts of iron, lead, silver, mercury, quinine sulphate, and quinine bisulphate.

Dose.—0.6 to 2 Gm.; 10 to 30 grains.

ACIDUM BORICUM—Boric Acid

Synonym, Boracic Acid. *Formula*, $H_3BO_3 = 61.54$.

Boric acid is seen as transparent, colorless scales, of a somewhat pearly luster, or more frequently as a light, white, very fine powder. It is unctuous to the touch, odorless, of a slightly bitter taste, and *soluble* in 18 parts of water, 15.3 parts of alcohol, and 4.6 parts of glycerin. It may be obtained by decomposing borax by a mineral acid.

Action and Uses.—Boric acid is feebly germicidal and non-irritating. Its solution in water is used in cases where a non-irritating, *mild antiseptic* is desired for the mouth, nose, ear, bladder, or rectum, and as a soothing *dusting powder* in cases of *chafing* and *intertrigo*. Internally it is employed to *inhibit gastric or intestinal fermentation* and to render the urine acid in cases of *cystitis* with alkaline urine. The official solution in glycerin, known as Glycerite of Boroglycerin, contains 31 per cent. of the acid, and is a popular vehicle with which to combine phenol and chrysarobin.

Incompatibilities.—Boric acid decomposes carbonates and bicarbonates, liberating carbon dioxide. Borates are decomposed by mineral acids liberating boric acid.

Dose.—0.3 to 0.6 Gm.; 5 to 10 grains.

Official Preparations

Glyceritum Boroglycerini (*Glycerite of Boroglycerin*).—A thick, syrupy, colorless liquid, made by dissolving 31 Gm. of Boric Acid by the aid of heat in enough Glycerin to make 100 Cc. of the finished product.

Used as a *preservative* and also in aqueous solution as a *mild antiseptic*.

Unguentum Acidi Borici (*Ointment of Boric Acid*).—Made by adding 80 Gm. of White Petrolatum to 10 Gm. of melted Paraffin, heating gently for ten minutes, and while still warm thoroughly incorporating 10 Gm. of powdered Boric Acid.

Used locally as a mild *antiseptic* and protecting *dressing*.

Liquor Antisepticus (*Antiseptic Solution*).—A 2 per cent. aqueous solution of boric acid containing about 0.1 per cent. of Benzoic Acid, 0.1 per cent. of Thymol, 0.025 per cent. of Eucalyptol, 0.05 per cent. of Oil of Peppermint, 0.025 per cent. of Oil of Gaultheria, 0.01 per cent. of Oil of Thyme, and 25 per cent. of Alcohol.

This example of polypharmacy is a toilet article, and was introduced into the *Pharmacopœia* to take the place of a popular proprietary article.

Sodii Boras (*Sodium Borate*). *Synonym*, Borax. *Formula* $Na_2B_4O_7 + 10H_2O = 379.32$.—Colorless, transparent, monoclinic prisms, or a white powder. It is without odor and has a sweetish, alkaline taste; is slightly efflorescent in warm air, dissolves in 17 parts of water; is insoluble in alcohol, but *dissolves* freely in warm glycerin. In this country, borax is usually obtained by purifying and crystallizing the impure natural product, found abundantly as a crystalline deposit in certain lakes in California, from deposits in Nevada, and also from calcium borate mined in California.

Action and Uses.—In single medicinal doses, borax probably has little effect upon the human economy, but in full doses, repeated several times a day and continued for some time, it acts as a depressant, and

disturbs both gastric and intestinal digestion. It is a feeble antiseptic, and retards fermentation, but is not a germicide. The chemical is most extensively used in solution as a *cleansing* and *mild antiseptic wash* for discharging mucous membrane, as in *lecuorrhea, otorrhea, nasal catarrh,* and *stomatitis.*

Incompatibilities.—Sodium borate is decomposed by mineral acids, boric acid being set free; it gives a precipitate with neutral solutions of many metallic salts, such as corrosive mercuric chloride, silver nitrate, lead acetate, barium chloride, calcium chloride, zinc sulphate, alum, and ferric salts.

Glycerin added to an aqueous solution slowly liberates boric acid, the solution becoming acid in reaction if the quantity of borax is small. Sodium borate, being alkaline in reaction, decomposes alkaloidal salts, in aqueous solution setting free the alkaloid, which, being less soluble than the alkaloidal salt, usually precipitates; glycerin added to the solution prevents the precipitation. Borax coagulates mucilage of acacia, and decomposes hydrated chloral. When triturated in the dry state with alum, benzoic, gallic, salicylic, or tartaric acids, it forms a damp mass. It increases the solubility in water of boric, benzoic, and salicylic acids.

Dose.—0.3 to 1 Gm.; 5 to 15 grains.

ACIDUM CAMPHORICUM—Camphoric Acid

Formula, $H_2C_{10}H_{14}O_4 = 198.62$.

A colorless, odorless, crystalline, non-irritating, dibasic acid, obtained by oxidizing camphor with hot nitric acid. It is *soluble* in 125 parts of cold water, and freely *soluble* in alcohol.

Action and Uses.—Camphoric acid checks secretions from the skin, and is employed to prevent the *night sweats of phthisis.* It is best *prescribed* in powders, to be taken in a little wine about two hours before the expected sweat.

Dose.—1 to 2 Gm.; 15 to 30 grains.

ACIDUM CITRICUM—Citric Acid

Formula, $H_3C_6H_5O_7 + H_2O = 208.50$.

A transparent, colorless, crystalline, tribasic, organic acid, obtained from the juice of lemons or limes. It is freely *soluble* in water, deliquesces in moist atmosphere, and effloresces in dry air.

Action and Uses.—When absorbed from the stomach the citric acid is decomposed in the blood and acts in a manner similar to alkaline salts. It is used as a *diuretic* and *antiscorbutic.* In concentrated form it is an irritant to the mucous membranes, but has no caustic action. In solution it may be used to *antidote poisoning by alkalies.*

The Syrup of Citric Acid is an agreeable vehicle. The citrates of potassium, sodium, and magnesium are official; the first two are used as alkaline diuretics, the last as a purgative.

Incompatibilities.—Citric acid decomposes carbonates and bicarbonates, liberating carbon dioxide.

Dose.—0.3 to 0.6 Gm.; 5 to 10 grains.

Official Preparation

Syrupus Acidi Citrici (*Syrup of Citric Acid*).—Made by adding a concentrated solution of Citric Acid to Syrup, and flavoring with tincture of Fresh Lemon Peel. Used as an Agreeable Vehicle.

Dose.—4 to 15 Cc.; 1 to 4 f℥.

ACIDUM GALLICUM—Gallic Acid

Formula, $HC_7H_5O_5 + H_2O = 186.65$.

An inorganic acid [$C_6H_2(OH)_3.COOH + H_2O$], prepared from tannic acid and occurring along with tannic acid in nutgall, oak bark, and many other astringent vegetable substances. The close relation of tannic acid and gallic acid may be noted by comparing their formulæ; Gallic Acid having the formula $C_7H_6O_5$, while that of Tannic Acid is $C_{14}H_{10}O_9$. It will be observed that two molecules of gallic acid minus H_2O would give the formula of one molecule of tannic acid. Gallic acid is white or fawn-colored, silky, interlaced needles or crystalline powder, having an astringent, slightly acidulous taste, is permanent in air, *soluble* in from 83 to 86 parts of water and in 4.14 parts of alcohol, and 12 parts of glycerin. Aqueous solutions do not precipitate alkaloids or albumin, thereby differing from tannic acid. Its solubility in water may be increased by adding potassium or sodium citrate.

Action and Uses.—Although an astringent, this acid does not coagulate albumin, and therefore is not useful as a local application to control hemorrhages. When administered by the mouth it is eliminated by the kidneys as *gallic* acid, and is used to control *remote hemorrhages*, prevent *profuse sweating*, and to *check excessive secretion* in *bronchorrhea* and *diabetes insipidus*. The acid is best *administered* in powders, capsules, pills, troches, or cachets.

Incompatibilities.—Gallic acid slowly decomposes when an aqueous solution of it is exposed to the air. Potassium permanganate, arsenic trioxide, and iodine decompose aqueous solutions of it; trituration with potassium permanganate results in combustion; alkali hydroxides form combinations with it in solution; if the hydroxide is in excess, the liquid changed first to a green color, and then red, and finally brown, if the acid is in excess the liquid becomes green in color. The acid decomposes alkali carbonates, liberating carbon dioxide; in solution with ammonia, sodium bicarbonate, or lime water, color changes occur;

precipitation results from the addition of gallic acid to solutions of ferric and ferrous salts, antimony, and potassium tartrate, lead acetate, or the salts of silver or gold. Its admixture with spirit of nitrous ether results in effervescence, and develops a red color.

Dose.—0.3 to 2 Gm.; 5 to 30 grains.

ACIDUM HYDRIODICUM DILUTUM—Diluted Hydriodic Acid

A clear, colorless, strongly acidulous liquid, containing not less than 10 per cent. by weight of absolute Hydriodic Acid (HI), and 90 per cent. of Water. It is *miscible* in all proportions with water and alcohol. When exposed to air or light, it gradually decomposes, the hydrogen being oxidized to form water and the iodine liberated, coloring the liquid brown. It should be kept in amber-colored, glass-stoppered, bottles protected from light.

The acid is prepared by acting upon an aqueous solution of potassium iodide and potassium hypophosphite with an alcoholic solution of tartaric acid, cooling, filtering, and partially concentrating by evaporating.

Action and Uses.—Hydriodic acid possesses alterative properties, common to the iodides in general. It is not as likely to interfere with digestion or produce the painful acne as the alkali iodides. The acid, or, more commonly, the official syrup made from it, is employed in the treatment of *subacute* and *chronic rheumatism*, and *asthma*. Syrup retards decomposition, and forms an efficient and agreeable vehicle for this medicament.

Incompatibilities.—Diluted hydriodic acid and the syrup made from it are such unstable compounds, and are chemically altered by so many substances, that they should not be compounded in prescriptions with other drugs or chemicals.

Dose.—0.5 to 1 Cc.; 8 to 16 minims.

Official Preparation

Syrupus Acidi Hydriodici (*Syrup of Hydriodic Acid*).—A transparent, colorless, or not more than pale straw-colored, syrupy liquid, containing about 1 per cent., by weight, of absolute Hydriodic Acid (HI). The syrup has an agreeable, acidulous, and sweet taste. It is prepared by mixing 100 Gm. of Diluted Hydriodic Acid, 300 Gm. of water, and 600 Gm. of Syrup.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

ACIDUM HYDROBROMICUM DILUTUM—Diluted Hydrobromic Acid

A transparent, odorless, colorless, acidulous liquid, containing not less than 10 per cent., by weight, of absolute Hydrobromic Acid (HBr), and 90 per cent. of water. It is *miscible* in all proportions with water

and alcohol. It may be made by the action of sulphuric acid upon potassium bromide. On account of its tendency to decompose when exposed to air or light, and become reddish or brownish from the liberation of free bromine, the acid should be kept in amber-colored, glass-stoppered bottles, protected from light.

Action and Uses.—Like other bromides, hydrobromic acid is a sedative to the nervous system, but is less likely to cause painful acne than the alkali bromides. It is employed in *insomnia, headache, tinnitus aurium, muscular spasms,* and *nervous excitement.* It is best *administered* in combination with syrup of ginger; it should be well diluted with a liberal quantity of water and taken through a glass tube.

Incompatibilities.—Diluted hydrobromic acid decomposes carbonates and bicarbonates. Like other mineral acids, it decomposes many salts of organic acids, such as the benzoate and salicylate, liberating them from their chemical combination with bases.

Dose.—4 to 12 Cc.; 1 to 3 f℥.

ACIDUM HYDROCHLORICUM—Hydrochloric Acid

Synonym, Muriatic Acid.

A colorless, fuming, corrosive liquid of an intensely acid taste, composed of 31.9 per cent., by weight, of absolute Hydrochloric Acid (HCl) and 68.1 per cent. of water. It emits white vapor when exposed to the air, and dense white fumes when brought in proximity to any of the preparations of ammonia. It is *miscible* in all proportions with water and alcohol. Its admixture with alcohol or alcoholic liquids should be carried out with caution, so as to avoid an explosion; the acid should be added gradually, without shaking, to the alcohol contained in an open vessel. With silver nitrate, it causes a white, curdy precipitate, which is soluble in ammonia and nitric acid. The acid is made by acting upon sodium chloride with sulphuric acid.

Action and Uses.—This liquid is a severe irritant to all the tissues, so that for medicinal uses it is far safer and better to employ diluted hydrochloric acid.

In *pharmacy* the strong acid is used as a solvent for many of the metals, and for decomposing many chemicals. It is used for generating chlorine, and in preparing diluted hydrochloric acid, nitrohydrochloric acid, and diluted nitrohydrochloric acid.

Poisonous Effects.—Hydrochloric acid is severely irritating to the skin, and corrosive to mucous membranes. If taken into the mouth and swallowed it gives rise to violent inflammation and corrosion of the mucous membrane of the lips, mouth, pharynx, œsophagus, and stomach; accompanied by a severe burning pain, vomiting, purging, and great prostration. If a considerable quantity of the acid is swallowed, shock may be so severe as to cause death almost immediately, although death from it is usually due to severe gastritis.

Antidote and Treatment of Poisoning.—The treatment of poisoning by hydrochloric acid is the same as that employed in poisoning from other mineral acids; weak alkalies, such as magnesium oxide, soap, lime water, and chalk should be administered freely to neutralize the acid; raw egg, milk, bland oils, and mucilage of acacia should be administered to protect and soothe the inflamed mucous membrane. It is usually necessary to employ morphine hypodermically to relieve pain, and stimulants to overcome profound depression.

Official Preparation

Acidum Hydrochloricum Dilutum (*Diluted Hydrochloric Acid*). *Synonym,* Diluted Muriatic Acid.—A clear, colorless, distinctly acidulous, irritating liquid, containing 10 per cent., by weight, of absolute Hydrochloric Acid (HCl), and 90 per cent. of water. It is prepared by adding 100 Gm. of hydrochloric acid to 219 Gm. of distilled water.

Action and Uses.—In small doses, diluted hydrochloric acid occasions a sense of warmth in the stomach, and either alone, or in conjunction with pepsin or *bitter tonics,* is employed to *assist feeble digestion,* when due to a diminution of the normal quantity of this hydrochloric acid in the gastric juices. When *administered,* it should be well diluted with water and taken through a glass tube; and, as a further precaution to prevent injury to the teeth, the mouth should then be well rinsed with a solution of sodium bicarbonate.

Dose.—0.6 to 4 Cc.; 10 to 60 minims.

ACIDUM HYDROCYANICUM DILUTUM—Diluted Hydrocyanic Acid

Synonym, Prussic Acid. - HCN

A clear, colorless, volatile, feebly acid liquid, composed of not less than 2 per cent., by weight, of absolute Hydrocyanic Acid (HCN), and 95 per cent. of water. The acid does not keep well, and should be preserved in amber-colored, glass-stoppered bottles in a cool dark place. It has the odor of bitter almond, but as its concentrated vapor is highly poisonous when inhaled, the bottle containing the acid should not be held to the nose and smelled. The acid may be prepared by the action of diluted hydrochloric acid upon silver cyanide.

Action and Uses.—Hydrocyanic acid is one of the most rapidly acting and deadly of all poisons. It quickly paralyzes the heart and respiratory centres, and also exerts its lethal action upon the nervous system and the blood. In medicinal doses, it is an antispasmodic and analgesic, and is used to relieve the pain of *enteralgia,* to *control vomiting,* and to *allay irritable cough.* On account of its rapid absorption and elimination it should be *administered* at short intervals. Locally, it is cautiously used to *relieve itching* of the skin in cases of *pruritus.*

Incompatibilities.—Diluted hydrocyanic acid is incompatible with alkalies, alkali carbonates, and bicarbonates. Potassium cyanide, being strongly alkaline in reaction, is incompatible with acids, with solution of hydrogen dioxide, and with many alkaloidal salts. If triturated with potassium nitrate or potassium chlorate, it detonates.

Poisoning.—Hydrocyanic acid and cyanides act with the greatest rapidity, either producing death almost instantly, or the individual falls to the floor with marked cyanosis of the face, clinched teeth, froths from the mouth, the eyes are wide open and staring, the respiration difficult, the heart slow and feeble; these symptoms may be followed by convulsions, asphyxia, collapse, and death.

Treatment of Poisoning.—On account of the rapidity with which death usually follows toxic doses of hydrocyanic acid or the cyanides, the treatment of poisoning is extremely unsatisfactory. *Cobalt nitrite, ferrous salts,* and solution of *hydrogen dioxide* are the *chemical antidotes;* when practical, the stomach should be emptied by the use of an emetic or stomach tube; atropine, ether, alcohol, or ammonia should be given as stimulants, and artificial respiration resorted to.

The following materials form a *chemical antidote,* and may prove of value if administered immediately after poisoning by cyanides; along with a stomach tube, they should be kept in packages at hand for instant use in photograph galleries, laboratories, and emergency ambulances:

No. 1. Twenty grains of potassium bicarbonate.

No. 2. Ten grains of ferrous sulphate.

No. 3. Thirty grains of magnesium oxide.

Dissolve No. 1 in one ounce of water and administer; to be quickly followed by No. 2 dissolved in an ounce of water and mixed with No. 3.

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

Official Cyanides and Ferrocyanides

Argenti Cyanidum (*Silver Cyanide*). *Formula,* AgCN = 132.96.—Silver cyanide is seen as a white powder, without odor or taste, gradually turning brown upon exposure to light. It is *insoluble* in water or alcohol; evolves hydrogen cyanide, and precipitates silver chloride upon the addition of diluted hydrochloric acid.

It is used in preparing diluted hydrocyanic acid.

Potassii Cyanidum (*Potassium Cyanide*). *Synonym,* Prussiate of Potash. *Formula,* KCN = 64.70.—White, opaque, amorphous pieces, or a white granular powder, odorless when perfectly dry; deliquescent in the air and exhaling the odor of hydrocyanic acid.

On account of its highly toxic properties, great caution should be used in tasting and handling this salt.

It is *soluble* in 2 parts of water, decomposed rapidly by boiling water, and sparingly soluble in alcohol.

The medicinal action and uses, and the poisonous effects of potassium cyanide are similar to those of diluted hydrocyanic acid.

Dose.—0.003 to 0.006 Gm.; $\frac{1}{20}$ to $\frac{1}{10}$ grain.

Potassii Ferrocyanidum (*Potassium Ferrocyanide*). *Synonym,* Yellow Prussiate of Potash. *Formula,* $K_4Fe(CN)_6 + 3H_2O = 419.62$.—Large, soft, transparent, yellow, four-sided, monoclinic tabular crystals or prisms; odorless, and having a mild, saline taste.

The salt is slightly efflorescent on exposure to the air, and is *soluble* in 4 parts of water, 2 parts of boiling water (without decomposing), and insoluble in alcohol.

Potassium Ferrocyanide, when pure, is almost without physiological effect, but is a valuable *chemical antidote* in cases of poisoning from the salts of copper. In chemistry it is used as a test for ferric salts. In pharmacy it is employed in manufacturing cyanides.

Dose.—0.6 to 1 Gm.; 10 to 15 grains.

ACIDUM HYPOPHOSPHOROSUM—Hypophosphorous Acid

A colorless, odorless, strongly acid liquid, containing 30 per cent., by weight, of absolute Hypophosphorous Acid, $PO.H_2(OH)$, and 70 per cent. of water. It is freely *miscible* with water.

Uses.—This acid is employed in making diluted hypophosphorous acid.

Official Preparation

Acidum Hypophosphorosum Dilutum (*Diluted Hypophosphorous Acid*). —A clear, colorless, odorless, strongly acid liquid, containing 10 per cent. of absolute hypophosphorous acid, $PO.H_2(OH)$, and 90 per cent. of water.

Uses.—Diluted hypophosphorous acid is rarely used as a medicine, but is employed to aid in dissolving the hypophosphites in the manufacture of syrup of the hypophosphites. Being a powerful reducing agent, it is employed as such to prevent liberation of free iodine in the official syrup of ferrous iodide, and other solutions of iodides liable to decomposition upon exposure to light.

Official Hypophosphites

The hypophosphites possess no medicinal advantages over the phosphates, being used as tissue builders where there is wasting or faulty nutrition; such conditions are often present in tuberculosis, rickets, ununited fractures, anemia, neurasthenia, and hysteria. By reason of their powerfully reducing action they *explode violently* if triturated with sugar, nitrates, or chlorates, and are incompatible with chlorine, iodine, mercurous and mercuric salts, permanganates, cupric sulphate,

bismuth subnitrate, arsenous and arsenic salts, ferric salts, and salts of silver.

Calcii Hypophosphis (*Calcium Hypophosphite*). *Formula*, $Ca(H_2PO_2)_2$ = 168.86. — Colorless, transparent, monoclinic, lustrous scales, or a white crystalline powder, made by heating phosphorus with milk of lime. It is odorless, has a nauseous, bitter taste, a neutral or slightly acid reaction, *dissolves* in 6.5 parts of water, and is insoluble in alcohol.

Uses.—Calcium hypophosphite and official preparations containing it are administered during the early stages of *tuberculosis* and other *wasting diseases*. In *pharmacy* it is used in preparing Hypophosphorous Acid, and enters into the composition of the Emulsion of Cod-liver Oil with Hypophosphites, the Syrup of the Hypophosphites, and the Compound Syrup of the Hypophosphites. Caution should be observed in *dispensing* calcium hypophosphite, as explosion is liable to occur if it is triturated or heated with nitrates, chlorates, or other oxidizing agents.

Dose.—0.3 to 0.6 Gm.; 5 to 10 grains.

Ferri Hypophosphis (*Ferric Hypophosphite*). *Formula*, $Fe(PH_2O_2)_3$ = 249.09.—A white, or grayish-white powder, made either by acting upon freshly precipitated ferrous sulphate with hypophosphorous acid, or by double decomposition between solutions of calcium hypophosphite and ferrous sulphate; calcium sulphate being separated by precipitation and the liquid, containing ferrous hypophosphite, evaporated. In the process of evaporation, ferrous hypophosphite is changed to ferric hypophosphite.

The salt is odorless, almost tasteless, and only *sparingly soluble* in water, 1 part requiring 2300 parts of cold water to dissolve it.

Uses.—Ferric hypophosphite, in addition to its properties as a hypophosphite, is useful as a ferruginous tonic. It is best *administered* in pills or capsules. It enters into the composition of the Compound Syrup of the Hypophosphites.

Incompatibilities.—Its incompatibilities are the same as those of other ferric compounds and of other hypophosphites.

Dose.—0.06 to 0.3 Gm.; 1 to 5 grains.

Mangani Hypophosphis (*Manganese Hypophosphite*). *Formula*, $Mn(PH_2O_2)_2 + H_2O$ = 201.54.—A pink crystalline powder, usually prepared by double decomposition between calcium hypophosphite and manganous sulphate. The powder is odorless, almost tasteless, is *soluble* in 6.6 parts of water, and almost insoluble in alcohol.

Uses.—Manganese hypophosphite is used as a *tissue builder* and hematic; rarely singly, but usually along with other hypophosphites in the compound syrup of the hypophosphites.

Incompatibilities.—In addition to the usual substances incompatible with hypophosphites, it is incompatible with carbonates, phosphates, and cyanides.

Dose.—0.06 to 0.03 Gm.; 1 to 5 grains.

Potassii Hypophosphis (*Potassium Hypophosphite*). *Formula,* KPH_2O_2 = 103.39.—White, opaque, hexagonal plates, or crystalline mass, or granular powder. It is usually prepared by precipitating calcium hypophosphite with potassium carbonate. Potassium hypophosphite is odorless, has a pungent, saline taste, is neutral or slightly alkaline in reaction, is very deliquescent, and *dissolves* in 0.5 part of water, and in 7 parts of alcohol. When heated in a dry state, the salt first loses its moisture, and then evolves, spontaneously, inflammable hydrogen phosphide gas, which burns with a bright yellow flame. Caution should be observed in *dispensing* potassium hypophosphite, as an explosion is liable to occur when it is triturated or heated with nitrates, chlorates, or other oxidizing substances. It must be kept in well-stoppered bottles.

Uses.—This salt, like other hypophosphites, is used in the early stages of *exhausting diseases.* It enters into the composition of the Syrup of Hypophosphites, of the Compound Syrup of Hypophosphites, the Emulsion of Cod-liver Oil with Hypophosphites, and is also used in the process of preparing Diluted Hydriodic Acid. As it is deliquescent, it cannot be given in pills or capsules, but must be *dispensed* in solution.

Dose.—0.3 to 1 Gm. = 5 to 15 grains.

Sodii Hypophosphis (*Sodium Hypophosphite*). *Formula,* $NaPH_2O_2 + H_2O$ = 105.29.—Small, colorless, transparent rectangular plates, of a pearly luster, or a white granular powder, usually made by the processes of double decomposition between calcium hypophosphite and sodium carbonate. It is odorless, has a bitterish-sweet, saline taste, is neutral or slightly alkaline in reaction, very deliquescent in moist air, and is *soluble* in about 1 part of water, and 25 parts of alcohol. When heated in a tube it loses its water of crystallization, and at about 200° C. (392° F.) is decomposed, evolving hydrogen and hydrogen phosphide, which burns spontaneously with a bright yellow flame. When heated or triturated with nitrates, chlorates, or other oxidizing agents, it is liable to explode. It must be kept in well-stoppered bottles.

Uses.—Like other hypophosphites, this chemical is used in the early stages of *wasting diseases,* and enters into the composition of the Emulsion of Cod-liver Oil with Hypophosphites, of the Syrup of Hypophosphites, and of the compound syrup of hypophosphites. Being deliquescent, it cannot be given in capsules or pills, but must be *dispensed* in solution.

Dose.—0.3 to 1 Gm.; 5 to 15 grains.

Official Preparations Containing Hypophosphites

The following official preparations contain hypophosphites:

Emulsum Olei Morrhuæ cum Hypophosphitibus (*Emulsion of Cod-liver Oil with Hypophosphites*).

Composition.—Cod-liver oil, 500 Cc.; Acacia, 125 Gm.; Calcium Hypophosphite, 10 Gm.; Potassium Hypophosphite, 5 Gm.; Sodium Hypo-

phosphite, 5 Gm.; Syrup, 100 Cc.; Oil of Gaultheria, 4 Cc.; Water, a sufficient quantity to make 1000 Cc.

Dose.—4 to 15 Cc.; 1 to 4 f℥.

Syrupus Hypophosphitum (*Syrup of Hypophosphites*).

Composition.—Calcium Hypophosphite, 45 Gm.; Potassium Hypophosphite, 15 Gm.; Sodium Hypophosphite, 15 Gm.; Diluted Hypophosphorous Acid, 2 Gm.; Sugar, 650 Gm.; Tincture of Fresh Lemon Peel, 5 Cc.; Water, a sufficient quantity to make 1000 Cc.

Dose.—4 to 16 Cc.; 1 to 4 f℥.

Syrupus Hypophosphitum Compositus (*Compound Syrup of Hypophosphites*).

Composition.—Calcium Hypophosphite, 35 Gm.; Potassium Hypophosphite, 17 Gm.; Sodium Hypophosphite, 17.50 Gm.; Ferric Hypophosphite, 2.25 Gm.; Manganese Hypophosphite, 2.25 Gm.; Quinine, 1.10 Gm.; Strychnine, 0.115 Gm.; Sodium Citrate, 3.75 Gm.; Diluted Hypophosphorous acid, 15 Cc.; Sugar, 775 Gm.; Water, a sufficient quantity to make 1000 Cc.

Dose.—4 to 15 Cc.; 1 to 4 f℥.

ACIDUM LACTICUM—Lactic Acid

A colorless, strongly acid, syrupy liquid, containing not less than 75 per cent. by weight of absolute Lactic acid ($CH_3.CHOH.COOH$) and about 25 per cent. of water. It absorbs moisture upon exposure to a damp air, and is freely *miscible* with water or alcohol. There are several processes for obtaining the acid from whey or sour milk.

Action and Uses.—Lactic acid is rarely given internally, but when combined with pepsin increases the solvent action of that ferment upon the proteids of the food. It is best *administered* well diluted in sweetened water, through a glass tube, after which the mouth should be rinsed. *Locally*, the acid is used to destroy *warts* and *condylomata;* it should be *applied* by means of a glass rod at intervals of three or four days. If used too freely or frequently it gives rise to considerable pain, and destroys the healthy tissues surrounding the growth. It enters into the preparation of Syrup of Calcium Lactophosphate.

Dose.—1 to 2 Cc.; 15 to 30 minims.

ACIDUM NITRICUM—Nitric Acid

Synonym, Aqua Fortis.

A colorless, fuming, very caustic and corrosive liquid, having a suffocating odor. It is composed of 68 per cent., by weight, of absolute Nitric Acid (HNO_3) and 32 per cent., of water. It is made by acting upon potassium nitrate with sulphuric acid. The acid dissolves copper,

silver, mercury, and a number of other metals with evolution of red fumes; the skin and woollen fabrics are corroded and stained yellow by it. It coagulates albumin, is freely miscible with water, and with alcohol gives off red fumes, forming aldehyde, acetic acid, formic acid, and carbonic acid. Caution must be exercised in mixing this and all other strong mineral acids with alcohol, as the evolved gases may cause explosions. The mixing should be done in open vessels of glass or porcelain, and, as the acid is destructive to cork, it should be preserved in glass-stoppered bottles.

Action and Uses.—Nitric acid is destructive to animal tissues, and is used locally to destroy *warts*, *condylomata*, and *chancres*. On account of its escharotic action, it should be applied very sparingly by means of a match-stick or small splint of wood, the unhealthy tissues surrounding the growth being protected by oil, or a layer of soap. The strong acid is used in making Diluted Nitric Acid, Nitrohydrochloric Acid, and Diluted Nitrohydrochloric Acid. It is rarely used internally, but, if so, it should be freely diluted with water and taken through a glass tube.

Poisonous Effects.—Poisoning from *undiluted* nitric acid is necessarily extremely severe and fatal, as it corrodes all the tissues with which it comes in contact, and, as a result, shock may be so severe as to cause almost instant death. The *diluted* acid, if taken in poisonous dose, produces yellow stains upon the lips, gives rise to inflammation and ulceration of the mouth, pharynx, œsophagus, and stomach; there is vomiting, purging, abdominal pain, and great prostration. Not infrequently the urine is greatly diminished and bloody, as the result of the general inflammation of the genito-urinary tract. If the destruction of the mucous membrane of the gastro-intestinal tract has been severe, death may result from inanition, by reason of inability to digest and absorb food. In cases that recover, strictures of the œsophagus, pylorus, and intestinal tract may ensue from cicatrices.

Treatment of Poisoning.—The treatment of poisoning by nitric acid consists in neutralizing it by administering weak alkalies, such as lime water, plaster from the wall, magnesium oxide, and soap; bland oils, milk, and raw eggs to protect and soothe the inflamed mucous membrane; morphine hypodermically to relieve pain; stimulants and external heat are employed to overcome depression.

Dose.—0.06 to 0.12 Cc.; 1 to 2 minims.

Official Preparation

Acidum Nitricum Dilutum (*Diluted Nitric Acid*).—A liquid composed of 10 per cent. by weight of absolute nitric acid (HNO_3) and 90 per cent. of water, made by diluting 100 Gm. of Nitric Acid with 580 Gm. of water.

Action and Uses.—Diluted nitric acid, when well diluted with water, is a local stimulant and astringent, and is used internally in the treat-

ment of *serous diarrhœa, dyspepsia*, and *chronic hepatic congestion.* When *administered* internally it should be freely diluted with water and taken through a glass tube, after which the mouth should be rinsed with water to which sodium bicarbonate has been added. A dilution of 1 part of diluted nitric acid with 25 parts of water is a useful lotion for the purpose of stimulating *indolent ulcers* and destroying *unhealthy granulations.*

Incompatibilities.—Nitric acid is incompatible with alkalies, alkaline carbonates, the salts of silver, mercurous compounds, ferric salts, the hypophosphites, bromides, iodides, phenol, and albumin. It dissociates many weak acids, such as carbonic, acetic, boric, and salicylic acids from their combination with bases. It is incompatible with so many substances that, as a rule, it should not be given in combination with other remedies.

Nitrates of the fixed alkalies are explosive when triturated with sugar, charcoal, sulphur, glycerin, alcohol, and some other readily oxidizable substances.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

ACIDUM NITROHYDROCHLORICUM—Nitrohydrochloric Acid

Synonyms, Nitromuriatic Acid, Aqua Regia.

Nitrohydrochloric acid is a yellow, fuming, and very corrosive liquid, having a strong odor of chlorine. It is made by mixing in a capacious glass vessel 18 Cc. of Nitric Acid with 82 Cc. of Hydrochloric Acid, and when effervescence has ceased should be poured into amber-colored, glass-stoppered bottles, which should be only half filled and kept in a cool place. These two strong mineral acids, when mixed without previous dilution, develop chlorine, nitrosyl chloride, and probably chlorohyponitric acid. The acid is freely *miscible* with water, but is liable to form explosive combinations when mixed with alcohol, tincture, syrup, and other organic and oxidizable substances. This is the only acid which dissolves gold. As it undergoes decomposition, it should be freshly prepared when needed.

Action and Uses.—Nitrohydrochloric acid is violently corrosive to the tissues, which are stained lemon yellow, even when greatly diluted. In medicinal doses, it stimulates the flow of bile, and is used in *hepatic torpor, gastro-duodenal catarrh*, and in the treatment of certain forms of *diarrhœa* and *oxaluria*. *Locally*, the strong acid may be employed as an escharotic for destroying *warts, condylomata*, and *chancres;* when used for these purposes the healthy tissues surrounding the growth should be protected with bland oil or a layer of soap, and the application of the acid carefully made with a match-stick or splinter of wood. The acid, when in diluted form, is destructive to the teeth, and when *administered internally* should be freely diluted with water and taken through a glass tube, after which the mouth should be rinsed

with water containing a small quantity of sodium bicarbonate. Only the recently prepared acid should be used, and as it rapidly loses some of its medicinal properties when diluted, the strong acid only should be prescribed, patients being cautioned as to its destructive properties, that it should be freely diluted when taken, and also that the stopper must be carefully removed, as the acid may spurt out and burn the face or eyes.

Poisonous Effects.—Strong nitrohydrochloric acid is so highly corrosive as to cause almost instant death if swallowed without first being freely diluted with water. In toxic doses, the diluted acid gives rise to gastritis accompanied by the usual symptoms of mineral acid poisoning, such as staining of the lips and mucous membrane of the mouth, pharynx, œsophagus, and stomach; vomiting, purging, abdominal pain, scanty, bloody urine, and profound exhaustion. Death may result from gastritis, or from inanition as a consequence of the destruction of the digestive glands and strictures of the œsophagus or pylorus, following recovery from acute poisoning.

Treatment of Poisoning.—The treatment to be followed in poisoning from this acid is the same as in poisoning from other mineral acids; the administration of weak alkalies, lime water, magnesium oxide, chalk, and soap to neutralize the acid; raw egg and bland oil to soothe and protect the inflamed mucous membrane; hypodermic injection of morphine to relieve pain, and application of external heat and stimulants to overcome depression.

Incompatibilities.—The acid is incompatible with so many substances that it should not be combined in the same prescription with any other drug or chemical.

Dose.—0.06 to 0.2 Cc.; 1 to 3 minims.

Official Preparation

Acidum Nitrohydrochloricum Dilutum (*Diluted Nitrohydrochloric Acid*). *Synonym,* Diluted Nitromuriatic Acid.—Diluted nitrohydrochloric acid is a colorless, or pale yellowish liquid, having a faint odor of chlorine and a very acid taste. It is prepared by mixing together in a capacious glass vessel 4 Cc. of Nitric Acid and 18.2 Cc. of Hydrochloric Acid, and when effervescence has ceased adding 77.8 Cc. of Distilled Water. As the diluted acid decomposes rapidly, only the recently prepared acid should be dispensed. It should be kept in amber-colored, glass-stoppered bottles, which should be opened with care, so as to avoid injury to the eyes and face.

Action and Uses.—Diluted nitrohydrochloric acid is less highly corrosive than the strong acid. When well diluted and taken through a glass tube it is used as an *hepatic stimulant*, and in treating *gastro-duodenal catarrh.*

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

ACIDUM OLEICUM—Oleic Acid

Formula, $HC_{18}H_{33}O_2 = 280.14$.

Oleic acid is a monobasic organic acid prepared in a sufficiently pure condition for pharmaceutical uses by cooling commercial oleic acid to about 5° C. (41° F.), then separating and preserving the liquid portion. It is a yellowish or brownish-yellow, oily liquid, having an odor and taste resembling that of lard. When exposed to air or long kept, it becomes rancid and darker in color. It is *insoluble* in water, but *dissolves* in alcohol, chloroform, benzene, petroleum benzin, and fixed and volatile oils. Its alcoholic solution is feebly acid and changes blue litmus paper to a red color. When cooled to about 4° C. (39.2° F.) it becomes a semisolid, and upon further cooling congeals to a white solid mass. When gently heated (50° C.) with alkaloids or metallic oxides it dissolves them, and upon cooling forms a soft ointment-like solid.

Action and Uses.—Oleic acid is used exclusively in preparing oleates, which, it is claimed, are more readily absorbed from the skin than the ordinary ointment bases.

Oleates are soft ointment-like preparations intended for absorption from the skin when applied by inunction. The oleates of *atropine, cocaine, mercury, quinine,* and *veratrine* are official.

ACIDUM PHOSPHORICUM—Phosphoric Acid

A colorless liquid of syrupy consistency, composed of 85 per cent. by weight of Orthophosphoric Acid [H_3PO_4 or $PO.(OH)_3$], and 15 per cent. of water. It is freely *miscible* with water and alcohol. The acid may be made by acting upon phosphorus with a mixture of nitric acid, water, and bromine.

Uses.—Phosphoric acid is used in making diluted phosphoric acid. The violent gastro-enteritis incident to *poisoning by it may be treated* by the administration of soap, magnesium oxide, lime water, to neutralize the acid; oils and milk, to soothe the inflamed mucous membrane.

Official Preparation

Acidum Phosphoricum Dilutum (*Diluted Phosphoric Acid*).—A colorless liquid containing 10 per cent. by weight of absolute Orthophosphoric Acid [H_3PO_4 or $PO.(OH)_3$], and 90 per cent. of water. It is made by adding 10 Gm. of Phosphoric Acid to 75 Gm. of Water.

Action and Uses.—Diluted phosphoric acid is free from astringency; it is a refrigerant, and a stimulant to gastric digestion. It is used to *allay thirst,* to *promote gastric digestion,* particularly in cases of *neurasthenia,* and also in *phosphaturia.*

So as to prevent injury to the teeth, the acid, when *administered,*

should be well diluted with water and taken through a glass tube; after which the mouth should be rinsed with a solution of sodium bicarbonate and water.

Dose.—1 to 4 Cc.; 15 to 60 minims.

Official Phosphates, Pyrophosphates, and Lactophosphates

Neither phosphates, pyrophosphates, hypophosphites, nor lactophosphites stimulate bone nutrition, but may be used to supply the deficiency of phosphates to the tissues when such insufficiency results from foods poor in phosphates, or from an abnormal increase in the elimination of phosphates. Such conditions are present in some cases of *tuberculosis, rickets, dental caries, ununited fractures, anemia, nervous exhaustion,* and *hysteria.*

Incompatibilities.—Phosphates are transposed by the inorganic acids, and some of the organic acids; they precipitate the soluble salts of magnesium.

Calcii Phosphas Præcipitatus (*Precipitated Calcium Phosphate*). *Formula,* $Ca_3(PO_4)_2 = 307.98$.—A bulky, white, amorphous powder, without odor or taste, almost *insoluble* in water; partially decomposed by hot water, and insoluble in alcohol. It is obtained as a precipitate by adding ammonia water to a solution of bone ash in water and hydrochloric acid.

For *administration,* a solution of it in water may be made by the addition of diluted phosphoric or lactic acid.

Dose.—0.6 to 2 Gm.; 10 to 30 grains.

Ferri Phosphas Solubilis (*Soluble Ferric Phosphate*).—Bright green, transparent scales, becoming dark upon exposure to light. It has an acidulous, slightly saline taste, is freely *soluble* in water and insoluble in alcohol.

Uses.—The salt is used as a mild ferruginous *tonic.* It may be *administered* in capsules or in solution. This scale salt enters into the composition of the Elixir, Glycerite, and the Syrup of the Phosphates of Iron, Quinine, and Strychnine. It is precipitated by strong alkalies and diluted mineral acids. Phosphoric acid added to a solution of the salt produces a white precipitate, which may be redissolved by adding a large excess of the acid.

Dose.—0.3 to 0.6 Gm.; 5 to 10 grains.

Ferri Pyrophosphas Solubilis (*Soluble Ferric Pyrophosphate*).—Thin, apple-green, transparent scales, becoming discolored when exposed to light. It has an acidulous, slightly saline taste, is freely *soluble* in water and insoluble in alcohol.

Uses.—The salt is a mild ferruginous *tonic,* and may be *administered* in capsules or in solution.

Soluble ferric pyrophosphate is precipitated by strong alkalies and diluted mineral acids. Phosphoric acid added to a solution of the

salt produces a white precipitate, which may be redissolved by adding a large excess of the acid.

Dose.—0.3 to 0.6 Gm.; 5 to 10 grains.

Glyceritum Ferri, Quininæ et Strychninæ Phosphatum (*Glycerite of the Phosphates of Iron, Quinine, and Strychnine*).—This liquid contains about 8 per cent. of Ferric Phosphate, 10.4 per cent. of Quinine, 0.08 per cent. of Strychnine, 20 per cent. of Phosphoric Acid, 50 per cent. of Glycerin, and water to make 100 parts.

Uses.—It is used in the manufacture of the Syrup of the Phosphates of Iron, Quinine, and Strychnine.

Dose.—1 to 2 Cc.; 15 to 30 minims.

Syrupus Ferri, Quininæ et Strychninæ Phosphatum (*Syrup of the Phosphates of Iron, Quinine, and Strychnine*, Easton's Syrup).—This syrup is made by adding 25 Cc. of the Glycerite of the Phosphates of Iron, Quinine, and Strychnine to enough Syrup to make 100 Cc.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Elixir Ferri, Quininæ et Strychninæ Phosphatum (*Elixir of the Phosphates of Iron, Quinine, and Strychnine*).—Contains about 1.75 per cent. of Soluble Ferric Phosphate, 0.875 per cent. of Quinine, 0.0275 per cent. of Strychnine, 0.2 per cent. of Phosphoric Acid, 0.9 per cent. of Ammonium Carbonate, along with Alcohol, Acetic Acid, Ammonia Water, Distilled Water, and Aromatic Elixir.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Sodii Phosphas (*Sodium Phosphate*). *Formula*, $Na_2HPO_4 + 12H_2O$ = 355.61.—Large, colorless, monoclinic prisms, or a granular crystalline salt, made by treating acid calcium phosphate with sodium carbonate. It is odorless, has a cooling saline taste, effloresces in the air, and gradually loses 25.1 per cent. of water of crystallization. When heated to about 40° C. (104° F.) it loses all its water of crystallization (60.3 per cent.), and at 100° C. (212° F.) is converted into sodium pyrophosphate. An aqueous solution is alkaline in reaction, a matter I believe of importance, as effervescent sodium phosphate is acid in reaction. The chemical is *soluble* in 5.5 parts of water at ordinary temperature, more freely soluble in hot water, and insoluble in alcohol.

Uses.—In addition to its use to supply phosphates to the tissues, it is more frequently employed as a *laxative, purgative*, and in *duodenal catarrh*. It is best *administered* dissolved in hot water, and before breakfast. For bottle-fed children small quantities may be given in the milk.

Sodium phosphate precipitates the soluble salts of magnesium from solution.

Dose.—2 to 8 Gm.; ½ to 2 ℥.

Sodii Phosphas Exsiccatus (*Exsiccated Sodium Phosphate*).—A white powder made by driving off all of the water of crystallization from effloresced sodium phosphate by subjecting it to a temperature of

100° C. (212° F.). Unless kept in well-stoppered bottles it absorbs moisture readily.

Uses.—Its action and uses are similar to those of sodium phosphate, its dose being about 60 per cent. less.

Dose.—1 to 4 Gm.; 15 to 60 grains.

Sodii Phosphas Effervescens (*Effervescent Sodium Phosphate*).—A white, granular powder containing 20 per cent. of Exsiccated Sodium Phosphate. It is prepared by mixing finely powdered Sodium Phosphate, Sodium Bicarbonate, Tartaric Acid, and Citric Acid, heating until the whole becomes uniformly moist, granulating and drying at a moderate temperature. To prevent decomposition it must be kept dry and in well-stoppered bottles.

Dose.—2 to 8 Gm.; ½ to 2 ℥.

Liquor Sodii Phosphatis Compositus (*Compound Solution of Sodium Phosphate*).—A colorless, transparent, slightly acidulous liquid, prepared by dissolving Sodium Phosphate, Sodium Nitrate, and Citric Acid in Water. Each fluidram represents one dram of uneffloresced sodium phosphate. The solution furnishes a convenient method of administering sodium phosphate. It is not suitable for adding to milk.

Dose.—2 to 8 Cc.; ½ to 2 ℥.

Sodii Pyrophosphas (*Sodium Pyrophosphate*). *Formula*, $Na_4P_2O_7 + 10H_2O = 443.02$. — Colorless, transparent, monoclinic prisms, or a crystalline powder, made by heating sodium phosphate to redness, dissolving the mass thus formed in water, filtering, and crystallizing. It has a cooling, saline, and faintly alkaline taste, is slightly efflorescent in warm air, *dissolves* in 11.5 parts of water, and is insoluble in alcohol. The salt is *used* for the same purposes and in the same dose as sodium phosphate and also in preparing ferric pyrophosphate.

Dose.—2 to 8 Gm.; ½ to 2 ℥.

Syrupus Calcii Lactophosphatis (*Syrup of Calcium Lactophosphate*). —Calcium lactophosphate as a salt is not official, but is employed in the official Syrupus Calcii Lactophosphatis, made by dissolving precipitated calcium carbonate in lactic and phosphoric acids and adding water, orange flower water, and sugar. Its use is to supply calcium phosphate to the tissues.

Dose.—8 to 16 Cc.; 2 to 4 f℥.

ACIDUM SALICYLICUM—Salicylic Acid

Formula, $HC_7H_5O_3 = 137.01$.

A monobasic organic acid consisting of light, fine needles, or bulky, white, crystalline powder, derived from oil of gaultheria or sweet birch, but generally made artificially by acting upon phenol with sodium carbonate and carbon dioxide. It has a strong ethereal-like odor, or, if

prepared synthetically, is odorless, has a sweetish, afterward acrid taste, and is *sparingly soluble* in water (1 in 308), but more freely soluble in alcohol, ether, and chloroform. Aqueous solutions of it change blue litmus paper to red. If an alcoholic solution of the acid is allowed to evaporate spontaneously in a glass or porcelain dish, protected from dust, the residue should be perfectly white. If it is pink or dark, it contains impurities of dust, iron, or phenol. With bases, salicylic acid forms salts; those of sodium, potassium, ammonium, and lithium are freely soluble in water, while the salicylates of bismuth and strontium are quite insoluble. Carbonates, bicarbonates, acetates, citrates, render the acid freely soluble in water through transposition of their bases, forming soluble salicylates.

Action and Uses.—When taken internally in full medicinal doses, salicylic acid causes a sensation of cerebral fulness, a slight vertigo, and ringing in the ears; it reduces temperature and depresses, rather than stimulates, the circulation and respiration. It unites with uric acid in the tissues and is eliminated as salicyluric acid. Locally, it is an irritant, and if given in full or long-continued doses, causes gastric irritation. The vegetable acid is less irritating and more valuable therapeutically than that made synthetically, but it is far more expensive. When large doses are required, the natural product should be used. It is employed in an *acute* and *subacute rheumatism*, in the treatment of *tonsillitis*, *lumbago*, *neuralgia*, and *pleurisy* and *headache* of rheumatic subjects. In cases of *gastric fermentation* it is used as an antiferment. Locally, diluted with an equal quantity of powdered starch, it is used as a dusting powder to prevent fetor in cases of excessive *sweating of the feet;* in ointments, it is used in the treatment of *subacute eczema;* in cerates, or collodion, it is used to soften and promote the ready removal of *corns*.

Administration.—If it is desired to *prescribe* the acid in aqueous solution, a sufficient quantity of alcohol should be added to dissolve it, as the acid is sparingly soluble in water. The addition of sodium or potassium carbonate, bicarbonate, acetate, and citrate also increase the solubility of salicylic acid in water, forming soluble salicylates. An objection suggested against the use of the acid in pill form or compressed tablets, is that in this concentrated form it is more likely to cause gastric irritation than when given in solution. In whatever way the acid is given, measures should be taken to prevent irritation of the stomach. It should be given after food either well diluted, or the patient should drink a full glass of water or milk after taking it. Alkaline salicylates are more soluble and less irritating than salicylic acid, but they are more disagreeable to the taste and also have a tendency to disturb digestion. The taste of salicylates may be disguised by compound syrup of sarsaparilla, syrup of bitter orange-peel, syrup of ginger, or by adjuvant elixir. The development of severe roaring in the ears, violent headaches, vomiting, delirium, disturbance of vision, profuse sweating, or the passage of olive-green urine in persons taking salicylic

acid or salicylates suggest the temporary, if not the permanent, discontinuance of the remedy.

Incompatibilities.—The incompatibility of salicylic acid and the soluble salicylates are numerous. Spirit of nitrous ether is changed to a yellow color, and in turn becomes red brown, and finally blue; ferric solutions are changed to a violet blue color; soluble salts of quinine are precipitated from the aqueous solution, as the insoluble quinine salicylate; lead acetate, sodium phosphate, and ethyl carbamate are liquefied or form a soft mass when triturated with salicylic acid, and the first two become moist when mixed with sodium salicylate. Antipyrine and sodium salicylate develop moisture when combined. Salicylic acid is thrown out of solution when citric, tartaric, or mineral acids are added to an aqueous solution of a salicylate. It decomposes alkali carbonates and bicarbonates, forming soluble salicylates and liberating carbon dioxide.

Dose.—0.3 to 1 Gm.; 5 to 15 grains.

Official Salicylates

Ammonii Salicylas (*Ammonium Salicylate*). *Formula*, $NH_4C_7H_5O_3$ = 153.94.—Usually seen as a white, crystalline powder, having a slightly saline, bitter taste, and a sweetish after-taste. It is *soluble* in 0.9 part of water, and 2.3 parts of alcohol. It is usually made by the action of salicylic acid upon ammonium carbonate.

Action and Uses.—Ammonium salicylate, like salicylic acid, when given in full doses for several days, or in several large doses, produces vertigo, ringing in the ears, and, unless some special precautions are taken, gastric irritability. This and other alkali salicylates are much more soluble and less irritating to the mucous membrane of the stomach and kidneys than is salicylic acid. Being permanent in air, the salt may be *prescribed* in powders, capsules, or compressed tablets; but being soluble in less than its weight of water, may be given in a saturated solution and *administered* in milk, as is customary with potassium iodide. Its *uses* are similar to those of other salicylates.

Incompatibilities.—Ammonium salicylate is incompatible with minera, acids, ferric salts and solutions, concentrated solution of strontium saltsl and solutions of the more soluble salts of quinine.

Dose.—0.3 to 0.2 Gm.; 5 to 30 grains.

Bismuthii Subsalicylas (*Bismuth Subsalicylate*). — Bismuth subsalicylate is a white or nearly white, amorphous or crystalline powder, of somewhat varying chemical composition. It is tasteless, odorless, and almost entirely *insoluble* in water. This compound may be prepared by adding a concentrated solution of sodium salicylate to a solution in glycerin of normal bismuth nitrate, and collecting, washing, and drying the precipitate thus formed.

Action and Uses.—Bismuth subsalicylate is a mild astringent and feeble germicide. It is used in treating *fermentative diarrhœa*. It is best *prescribed* in powders or capsules.

Incompatibilities.—The salt is decomposed by mineral acids, alkalies, iodides, and sulphides. Solutions of ferric salts give with it a violet color.

Dose.—0.3 to 0.6 Gm.; 5 to 10 grains.

Lithii Salicylas (*Lithium Salicylate*). *Formula,* $LiC_7H_5O_3 = 142.99$. —A white or grayish-white powder, odorless, having a sweetish, disagreeable taste, deliquescent in moist atmosphere, and freely *soluble* in water and alcohol. Aqueous solutions of it should be colorless, showing it to be free from iron or organic impurities. It is prepared by acting upon lithium carbonate with salicylic acid.

Action and Uses.—In medicinal action and use, lithium salicylate is similar to salicylic acid, except that it is never used locally; it is freely soluble and less irritating to the gastro-intestinal mucous membrane than the acid. On account of its deliquescent properties it should not be dispensed in powders or compressed tablets, but may be *prescribed* in capsules, cachets, or aqueous solutions. A very satisfactory way of *administering* it is in milk or junket.

Incompatibilities.—In solution it is incompatible with all mineral and organic acids, with carbonates, and soluble salts of quinine.

Dose.—0.6 to 2 Gm.; 10 to 30 grains.

Methylis Salicylas (*Methyl Salicylas*). *Formula,* $CH_3C_7H_5O_3 = 150.92$.—A colorless, oily liquid, having a wintergreen-like odor. It is sparingly soluble in water, but freely *soluble* in alcohol and fixed and volatile oils, the alcoholic solution being neutral or only slightly acid to litmus paper. Methyl salicylate exists naturally in the oil of gaultheria and birch, from which it is obtained.

Action and Uses.—Methyl salicylate is used internally and locally in the treatment of *rheumatic affections,* and in several pharmaceutical preparations for flavoring them. Therapeutically it is not as valuable as the oil of wintergreen or betula, which it greatly resembles in physical and chemical properties. The most convenient *method of administering* it is in soft capsules. It is *incompatible* with ferric salts, spirit of nitrous ether, and mineral acids.

Dose.—0.6 to 1 Cc.; 10 to 15 grains.

Phenylis Salicylas (*Phenyl Salicylate*). *Synonym,* Salol. *Formula,* $C_{13}H_{10}O_3 = 212.47$.—Phenyl salicylate is the salicylic ester [$C_6H_4(OH)$-$COOC_6H_5$.1:2] of phenol. It is obtained by the action of salicylic acid upon phenol in the presence of acid chlorides, such as phosphoryl chloride ($POCl_2$), or carbonyl chloride ($COCl_2$). It is a white, crystalline powder, having a faint, aromatic odor and a slight but characteristic taste. It is very *sparingly soluble* in water; *dissolves* in 5 parts of alcohol, and is very soluble in ether, chloroform, and fixed and volatile oils.

Action and Uses.—Phenyl salicylate passes through the stomach unchanged, but in the presence of the alkaline juices of the intestines and the pancreatic juices it decomposes, yielding about 36 per cent.

of phenol and 64 per cent. of salicylic acid. It is employed as an intestinal antiseptic, and as an antirheumatic. Large doses sometimes give rise to the mild physiological effects observed after full doses of phenol and after full doses of salicylate. The chemical may be *dispensed* in powders, capsules, pills, or wafers, but not in compressed tablets.

In *pharmacy*, it furnishes a suitable coating for pills, intended to act within the intestines. Such pills may be coated by dipping them into phenyl salicylate melted at a temperature of about 42° C. (107.6° F.).

Incompatibilities.—Phenyl salicylate liquefies when triturated with phenol, hydrated chloral, betanaphthol, and thymol, and forms a damp powder which quickly dries when triturated with antipyrine.

Dose.—0.12 to 0.6 Gm.; 2 to 10 grains.

Sodii Salicylas (*Sodium Salicylate*). *Formula*, $NaC_7H_5O_3 = 158.89$. —A microcrystalline, or an amorphous powder; colorless, or having a faint pink tinge; odorless, and with a sweetish saline taste. It is freely *soluble* in water, and somewhat less so in alcohol and glycerin.

Action and Uses.—Sodium salicylate is used in the treatment of *rheumatism* and *rheumatic affections*. It is less irritating and more soluble than salicylic acid, but full doses give rise to the same disagreeable sensation produced by full doses of the acid. It may be *administered* in powder, compressed tablets, capsules, or in solution of water, glycerin, or alcohol. After being taken for a time its taste becomes unpleasant and nauseating, and, therefore, it is best given in compressed tablets, capsules, or cachets. Its taste in solution may be disguised by compound syrup of sarsaparilla, syrup of bitter orange peel, or syrup of ginger. A favorite method of administering it is by adding the powder to milk, which, if desired, may be made into junket by the addition of rennet.

Incompatibilities.—With antipyrine it forms a soft mass, with sodium phosphate a damp powder; it precipitates the salts of quinine, and is decomposed by mineral acids, citric acid, and tartaric acid, with the separation of salicylic acid.

Dose.—0.6 to 0.2 Gm.; 10 to 30 grains.

Oleum Betulæ (*Oil of Betula*). *Synonym*, Oil of Sweet Birch. *Family*, Betulaceæ.—A volatile oil, closely resembling the oil of gaultheria, obtained by maceration and distillation from the bark of sweet birch. The oil of betula contains a considerable quantity of *Methyl Salicylate*, and is used for the same purpose as oil of gaultheria.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

Oleum Gaultheriæ (*Oil of Gaultheria*). *Synonym*, Oil of Wintergreen. *Family*, Ericaceæ.—A colorless, or almost colorless liquid, having a characteristic, strongly aromatic odor, and a sweetish, warm, aromatic taste, distilled from the leaves of *Gaultheria procumbens*, a creeping plant, with ascending branches, indigenous to North America. Oil of gaultheria contains about 99 per cent. of methyl salicylate, being

one of the neutral sources of salicylic acid. For all practical purposes, it is identical with oil of betula and methyl salicylate.

Action and Uses.—The action of oil of gaultheria, oil of betula, and methyl salicylate is practically the same as those of salicylic acids, except that these are less irritating and are aromatic and carminative. These substances are used internally in the same class of cases as is salicylic acid, and also locally in the treatment of *articular* and *muscular rheumatism, lumbago,* and *neuralgia.* In many instances, they may be substituted for salicylic acid when that substance is not well borne by the stomach.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

ACIDUM STEARICUM—Stearic Acid

Formula, $HC_{18}H_{35}O_2 = 282.14$.

A white, glossy solid, monobasic, organic acid, without odor or taste, usually obtained from tallow. It is permanent in air, insoluble in water, *soluble* in about 16 parts of alcohol, and freely soluble in boiling alcohol and in ether. The official acid melts at 69.2° C. (156.6° F.); the commercial acid should have a melting point not lower than 56° C. (132.8° F.).

Uses.—It is employed in the manufacture of stearates, an example of which is to be found in the official Zinc Stearate.

ACIDUM SULPHURICUM—Sulphuric Acid

Synonym, Oil of Vitriol.

A heavy, syrupy, corrosive, caustic, colorless liquid, composed of not less than 92.5 per cent., by weight, of absolute Sulphuric Acid (H_2SO_4), and 7.5 per cent. of water. It is *miscible* in all proportions with water and alcohol, but, on account of the development of heat and its tendency to sputter when mixed with liquids, caution should be observed to add the *acid to the diluent* in a capacious open vessel. The acid is made by bringing the vapor of burning sulphur and the vapor of nitric acid together in the presence of steam.

Action and Uses.—Sulphuric acid is a powerful irritant, corrosive poison, which dehydrates the tissues and carbonizes them. It may be employed locally as a *caustic* to destroy *warts, condylomata,* and *chancres,* although the burn after its application is painful and heals slowly. When used as an escharotic, the tissues surrounding the growth or ulcer should first be protected by bland oils or a thin layer of soap, and the acid then applied by means of a splinter of wood or a small glass rod.

On account of the dangers liable to arise from handling and administering strong sulphuric acid, Diluted Sulphuric Acid, and Aromatic

Sulphuric Acid are commonly employed for internal administration. They are powerfully astringent, and are used in the treatment of *serous diarrhœa, Asiatic cholera,* and *night sweats.* When *administered* internally, they should be freely diluted with water and taken through a glass tube, the mouth being afterward rinsed with water containing sodium bicarbonate.

Poisoning and Treatment.—If a large quantity of the undiluted acid is swallowed, the person may fall to the earth dead almost instantly from the severely irritating and carbonizing effect of the drug upon the stomach. A smaller quantity gives rise to all the symptoms of gastro-enteritis, such as severe vomiting, purging, violent abdominal pain, great prostration, accompanied by inflammation of the genito-urinary tract, as shown by the frequent passage of a small quantity of bloody urine. Lethal quantities may cause death from acute gastro-enteritis, or from inanition due to the destruction of the digestive glands of the alimentary tract. The corrosive effect of the acid produces a black stain about the lips and mouth. If the patient survives until the fourth day, he may then develop swelling of the parotid gland, and at a later period strictures throughout the gastro-intestinal tube.

The *treatment of poisoning* from this acid consists in the free administration of mild alkalies, such as chalk, magnesium oxide, magnesium carbonate, plaster from the wall, and soap to neutralize the acid; bland oils, raw eggs, and milk to protect the inflamed mucous membrane; morphine hypodermically to relieve severe pain, and external heat and stimulants to overcome collapse.

Incompatibilities.—Sulphuric acid and sulphates precipitate as insoluble sulphates, all soluble salts of lead, barium, strontium, and calcium. Sulphuric acid, strong or diluted, neutralize alkalies, decompose carbonates, bicarbonates, iodides, bromides, citrates, benzoates, borates, and salicylates; in fact, it transposes the salts of nearly all of the other acids.

Official Preparations

Acidum Sulphuricum Aromaticum (*Aromatic Sulphuric Acid*).—A reddish, or brown, aromatic liquid, containing not less than 20 per cent. by weight, of absolute Sulphuric Acid (H_2SO_4). It is made by gradually adding, with constant stirring, 111 Cc. of official Sulphuric Acid to 700 Cc. of Alcohol, allowing the mixture to cool, and then adding 50 Cc. of Tincture of Ginger and 1 Cc. of Oil of Cinnamon, and lastly enough Alcohol to make 1000 Cc.

Action and Uses.—Aromatic sulphuric acid forms an agreeable and convenient means of administering sulphuric acid, and, if desired, may be mixed with aqueous, alcoholic, and syrupy liquids. Its action, uses, administration, and incompatibilities are similar to, although less powerful than, those of sulphuric acid. It is twice as strong as diluted sulphuric acid.

Dose.—0.3 to 1 Cc.; 5 to 15 minims.

Acidum Sulphuricum Dilutum (*Diluted Sulphuric Acid*).—A colorless liquid containing not less than 10 per cent., by weight, of absolute Sulphuric Acid (H_2SO_4), and 90 per cent. of water. It is made by gradually adding, with constant stirring, 100 Gm. of sulphuric acid to 825 Gm. of distilled water.

Action and Uses.—On account of the dangers arising from handling strong sulphuric acid, diluted sulphuric acid and aromatic sulphuric acid are more commonly employed for internal use. Their action, uses, administration, antidotes, and incompatibilities are similar to, although less powerful than, those of sulphuric acid.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

ACIDUM SULPHUROSUM—Sulphurous Acid

Sulphurous acid is a colorless liquid, containing not less than 6 per cent. by weight of Sulphur Dioxide (SO_2) and about 94 per cent. of water. It has an acid, sulphurous taste, and the odor of burning sulphur. The acid is prepared by passing a stream of gaseous sulphur dioxide into water.

Action and Uses.—Sulphurous acid is a parasiticide, disinfecting and bleaching agent. Taken internally, well diluted with water and through a glass tube, it is employed as an antiferment, and as an astringent in the treatment of *fermentative, serous diarrhœa*. Locally it is used as a parasiticide in the treatment of *sycosis*, commonly called barber's itch, and some other *parasitic diseases of the skin*. As a disinfectant in the sick room, it should be placed in the vessel into which the material to be disinfected is received, the vessel should then be covered and permitted to stand fifteen to twenty minutes before being emptied. As the acid is destructive to woollen, cotton, and linen fabrics, it is not suitable for sprinkling about the room. As a disinfectant, it may be used in the undiluted or diluted form, 1 part of the acid to 10 parts of water.

Poisoning and Treatment.—In cases of accidental poisoning from ingestion of the acid, it may be neutralized by administering weak alkalies, such as magnesium oxide, lime water, or soap, and the administration of bland oils, such as sweet oil or expressed oil of almond to protect the mucous membrane.

Dose.—0.6 to 4 Cc.; 10 to 60 minims.

ACIDUM TANNICUM—Tannic Acid

Synonym, Tannin. *Formula,* $HC_{14}H_9O_9 = 319.66$.

Tannic acid is a monobasic, organic acid ($C_{13}H_9O_7.COOH$) obtained from *nutgall*. By reason of its close chemical relation to gallic acid it is sometimes called *digallic acid*. It is a constituent of tea, oak bark, logwood, gambir, krameria, and many other vegetable substances.

Tannic acid is seen either as a light-yellowish, amorphous powder, gradually becoming darker upon exposure, or as glistening scales or spongy masses. It is odorless, or almost so; has a strongly astringent taste; and acid reaction, and is freely soluble in water, alcohol, and slightly warmed glycerin.

Action and Uses.—Tannic acid is an astringent and styptic. It is used internally in the treatment of *diarrhœa, gastric* or *intestinal hemorrhage, diabetes insipidus,* and *general sweating.* It is used locally to *harden the skin,* and, therefore, to prevent *bed sores;* to control *bleeding;* to check *excessive secretions* in cases of simple or specific *urethritis* or *vaginitis.* The vegetable astringents depend upon this acid for their therapeutic properties. It may be *prescribed* in pills, capsules, cachets, tablets, solution, or powders.

Incompatibilities.—Tannic acid precipitates most alkaloids, many glucosides, and bitter principles, antipyrine, the salts of antimony, bismuth, copper, lead, mercury, and silver; ferric solutions are changed to a black color and are precipitated; concentrated ferrous solutions form with it a white, gelatinous precipitate, becoming blue upon exposure to the air; solutions of sodium arsenate and potassium arsenite are precipitated by it, as are solutions of albumin, gelatin, and starch; it decomposes spirit of nitrous ether and develops with it a red color; if triturated with potassium chlorate, it is likely to oxidize rapidly and explode.

Dose.—0.12 to 0.6 Gm.; 2 to 10 grains.

Official Preparations

Collodium Stypticum (*Styptic Collodion*).—A liquid preparation made by adding 20 Gm. of Tannic Acid to a mixture of 5 Cc. of Alcohol, and 25 Cc. of Ether, and then adding enough Collodion to make 100 Cc. of the finished product, and shaking occasionally until the acid is dissolved. Used locally.

Glyceritum Acidi Tannici (*Glycerite of Tannic Acid*).—Made by dissolving 20 Gm. of Tannic Acid in 80 Gm. of Glycerin. Used locally.

Unguentum Acidi Tannici (*Ointment of Tannic Acid*).—Made by dissolving 20 Gm. of Tannic Acid in 20 Gm. of Glycerin, and incorporating with 60 Gm. of Ointment. Used locally.

Trochisci Acidi Tannici (*Troches of Tannic Acid*).—Each contains about one grain (0.06 Gm.) of Tannic Acid.

ACIDUM TARTARICUM—Tartaric Acid

Formula, $H_2C_4H_4O_6 = 148.92$.

Tartaric acid is a dibasic, organic acid, usually prepared from impure potassium tartrate, known as *Argol,* which is found lining the inner

surface of wine casks. It is a white crystalline powder or colorless, translucent, monoclinic prisms, without odor, having a purely acid taste, is permanent in air, and *freely soluble* in water and alcohol.

Action and Uses.—In overdoses, tartaric acid is an irritant to the stomach and mucous membranes and intestines, and gives rise to gastro-enteritis. It is occasionally employed in preparing *acidulous drinks* and *effervescing draughts*. It is one of the ingredients of Seidlitz Powders, and enters into the preparation of a number of the granular effervescent salts.

Dose.—0.3 to 1.2 Gm.; 5 to 20 grains.

ACIDUM TRICHLORACETICUM—Trichloracetic Acid

Formula, CCl_3COOH.

Trichloracetic acid is a monobasic, organic acid, usually obtained by the oxidation of hydrated chloral with nitric acid. It should be kept in dark, amber-colored, well-stoppered bottles in a cool place. It is seen as white, deliquescent, rhombohedral crystals, having a slight, characteristic odor; very soluble in water, alcohol, and ether. If 10 parts of the acid are liquefied by the addition of 1 part of water, a permanent fluid mixture results. It undergoes some change in alcohol, and an aqueous solution of it on boiling decomposes with the formation of chloroform and carbon dioxide. Sodium and potassium carbonate also decompose it, with the formation of chloroform and carbon dioxide.

Action and Uses.—The acid is a valuable cauterizing agent, which gives rise to little or no pain, and is followed by only a slight inflammatory action, and is, therefore, suitable for the removal of *warts* and other small *vegetation*.

The acid is never used internally.

Poisoning and Treatment.—If taken internally by accident, the acid corrodes all tissues with which it comes in contact, and bleaches them white; it gives rise to pains in the mouth, pharynx, and epigastrium, vomiting and purging. The suitable *antidotes* are alkalies to neutralize it, and bland oils, milk, and raw eggs to soothe and protect the mucous membranes.

ACONITUM—Aconite

Synonym, Monkshood. *Family,* Ranunculaceæ.

Aconite is the dried tuberous root of *Aconitum napellus*, a perennial herb 2 to 5 feet (0.6 to 1.5 M.) high, which grows in mountainous regions in Europe, Asia, Switzerland, and North America. As seen in the market, the root is slenderly conical; 1½ to 4 inches (40 to 100 mm.) long, ½ to 1 inch (10 to 20 mm.) thick at the crown; occasionally split;

longitudinally wrinkled; dark brown, and marked with coarse whitish root scars. Its fracture is short, horny or mealy; internally whitish or white-brown, with irregular cambium zone 5 to 7 angled. Its taste is sweetish, soon becoming acrid, and developing a tingling sensation of the tongue and mucous membrane of the mouth. The root should contain not less than 0.5 per cent. of Aconitine. Formerly the root was known as Aconiti radix, and the leaves as Aconiti folia, but since the latter has been dismissed from the *Pharmacopœia* the name of the root from which all the pharmaceutical preparations are made has been changed to *Aconitum*. Several alkaloids have been isolated from the root, but *aconitine* is the only one used. This alkaloid, or modifications of it, according to the process employed in its extraction from the root, varies greatly in its physical properties and potency; that made officially is crystalline in character and much more powerful and certain in its action than the amorphous variety. In addition to aconitine, the roots contain *napelline*, *benzaconine*, resin, and a small quantity of oil.

Action and Uses.—Under the influence of aconite, the pulse becomes slow and weaker by reason of the depressing influence of the drug upon the heart; rapid respiration due to fever is quieted by the depressant effect of the drug upon the respiratory centres; heightened temperature is lowered by increased heat radiation from the body; restlessness is quieted by its sedative effect upon the spinal cord and nerves. When locally applied, aconite is an anesthetic of considerable power, but, owing to its highly toxic properties, it is seldom used for this purpose. The remedy is used in the treatment of *cardiac hypertrophy*, *acute endocarditis*, and *pericarditis*, and in the early stages of *inflammation of a sthenic type*, such as *acute tonsillitis*, *acute bronchitis*, *acute orchitis*, *acute rhinitis*, etc. It is also administered to quiet *vomiting* in cases of *acute gastritis*, and to relieve *neuralgic pains*. The tincture or fluidextract spread upon a small pledget of cotton is sometimes used as a local application to relieve *toothache* when due to an exposed nerve; when used in this way, patients should be cautioned not to swallow the saliva. Though not considered an entirely safe practice, aconitine is sometimes employed *in ointments* or *oleates* by inunction for the relief of *neuralgic pains*, but as the drug is rapidly absorbed from the skin, care should be taken not to use enough to produce poisonous results. If used at all in treating children, aconite or its preparations should be *administered* in very small doses. It should never be administered to young infants nor to adults who are in a state of depression.

Poisoning.—Overdoses of aconite produce tingling of the mucous membrane of the tongue, lips, and mouth, later extending to the finger tips or other parts of the body; the pulse becomes extremely slow and feeble, and, as death approaches, rapid and almost imperceptible; the respiration is shallow and slow, the skin pale, cold, and clammy;

the sclera of the eye is bloodless and has a pearly appearance; there is great prostration, vomiting is unusual, consciousness is preserved.

Treatment of Poisoning.—Unless seen before poisonous symptoms come on, the use of the stomach pump and emetics are not advisable, as both measures place an additional strain upon the heart. The patient should be placed in a prone position, with feet higher than the head, and hypodermic injections of ether, digitalis, strychnine, or atropine administered; if vomiting, which is rare, should come on, the patient should be turned upon his side and be required to vomit into a towel, as *all efforts to resume an erect position are dangerous* to persons poisoned by aconite. The application of external heat to the body of the patient should be resorted to.

Official Preparations

Fluidextractum Aconiti (*Fluidextract of Aconite*).—Made with a menstruum of 7.2 parts of alcohol and 2.5 parts of water. Each 100 Cc. should contain 0.4 Gm. of aconitine.

Dose.—0.03 to 0.12 Cc.; $\frac{1}{2}$ to 2 minims.

Tinctura Aconiti (*Tincture of Aconite*).—Made by percolating 10 Gm. of Aconite with a menstruum in the proportion of 70 parts of Alcohol and 30 parts of Water to make 100 Cc. Each 100 Cc. of tincture should contain 0.045 Gm. of aconitine.

Dose.—0.3 to 2 Cc.; 5 to 20 minims.

Aconitina (*Aconitine*).—Aconitine is a *crystalline* alkaloid obtained from aconitine; it was official in the *United States Pharmacopœia* of 1840, but on account of the lack of uniformity in the physical and physiological properties of that substance it was dismissed. In the present *United States Pharmacopœia* aconitine of the *crystalline* character has been admitted, and is described as colorless or white rhombic tablets or prisms, possessing no odor, permanent in air, and producing, in extremely diluted solution, a characteristic tingling sensation when brought in contact with the mucous surface of the tongue or lips. The alkaloid itself should never be tasted, and in solution only when largely diluted, and then with the utmost caution.

Action and Uses.—The physiological action of aconitine is similar to that of aconite. It may be employed as a *circulatory sedative* and *depressant* under the same conditions as are the preparations of aconite, although it is rarely used for such purposes. It is frequently administered to relieve *neuralgic pains* and also applied locally *in ointments and oleates* to relieve *neuralgic pains*. It is probably the most highly toxic of all official alkaloids, and the greatest caution should be observed when employing it internally or locally; $\frac{1}{128}$ of a grain (0.0005 Gm.) has proved fatal to an adult. The remedy should never be administered to children.

Dose.—0.00016 to 0.00032 Gm.; $\frac{1}{400}$ to $\frac{1}{200}$ grain.

ADEPS—Lard

Synonym, Purified Leaf Lard.

Lard is a soft, white fat; soluble in ether, chloroform, benzin, carbon disulphide; melts and becomes a clear liquid at 40° C. (104° F.), and is neutral in reaction. On contact with air and exposure to light it oxidizes, becoming acid in reaction, developing a disagreeable odor and acrid taste, and is then said to be rancid. Warmth and also its admixture with alkalies hasten these changes. The whitest and finest lard is prepared from the fat adhering to the mesentery, omentum, and kidneys of hogs fed upon corn or other grain and killed during cold weather. During the warm season, benzoinated lard, which keeps well, should replace the plain lard in the formulæ of ointments, cerates, or other preparations calling for lard.

Official Preparations

Adeps Benzoinatus (*Benzoinated Lard*).—Benzoinated lard is made by thoroughly mixing 2 Gm. of coarsely powdered Benzoin with 100 Gm. of Lard, melting by means of a water bath for two hours, stirring occasionally, and lastly straining the liquid through muslin and stirring occasionally while cooling.

Used as an ointment basis.

Oleum Adipis (*Lard Oil*).—Lard oil is a fixed oil expressed from lard at a low temperature. It is a colorless, or pale yellow liquid, having a peculiar characteristic odor and a bland taste, is soluble in ether, chloroform, benzin, and carbon disulphide, but is insoluble in cold alcohol or water. The oil, consisting principally of olein, is used in medicine as an emollient, and, in pharmacy, to soften cerates. There are no official preparations of it.

ADEPS LANÆ—Wool Fat

Wool fat is the purified fat of the wool of sheep. It is a light, yellowish-white, tenacious, unctuous mass, having a slight peculiar odor; insoluble in, but freely miscible with, large quantities of water; sparingly soluble in cold alcohol and readily soluble in ether and chloroform. It melts at about 40° C. (104° F.); does not become rancid upon exposure to the air; possesses considerable adhesiveness, and is more readily absorbed from the skin than other fats.

Action and Uses.—Wool fat is employed as an ointment basis, and enters into the formula of Cerate of Lead Subacetate. For general use as an ointment basis it is less suitable than hydrous wool fat.

ADEPS LANÆ HYDROSUS—Hydrous Wool Fat

Synonym, Lanolin.

Hydrous wool fat is the purified fat of the wool of sheep mixed with 30 per cent. of water. This ointment basis, although insoluble in water, may be mixed with twice its weight of any aqueous solution without altering its form; it also mixes well with mineral acids. It is a light yellow or nearly white, soft solid, having a peculiar odor; melts at about 40° C. (104° F.); has a greater adhesiveness than lard; *does not become rancid;* is miscible with water and glycerin, and forms turbid mixtures with ether and chloroform. It is more readily absorbed by the skin than any other fat, and for this reason is employed as an *ointment basis* for promoting the absorption of mercury, belladonna, resorcin, ichthyol, acids, alkaloidal salts, and many other substances. If it is desired to lessen its adhesiveness, it may be mixed with equal parts of petrolatum.

Uses.—It is used in preparing the official Mercuric Plaster, and enters into the preparation of the official Ointments of Ammoniated Mercury, Red Mercuric Oxide, Yellow Mercuric Oxide, Belladonna, and Stramonium.

ÆTHER—Ether

Synonym, Sulphuric Ether.

Ether is a highly inflammable, colorless, volatile liquid, containing about 96 per cent. of Ethyl Oxide and 4 per cent. of alcohol containing a little water. It is made by distilling and purifying a mixture of alcohol and sulphuric acid. The vapor of ether is inflammable and heavier than air; the liquid is freely miscible with water, alcohol, and chloroform, and is a good solvent for fats, oils, resins, oleoresins, alkaloids, and many other substances. It has a peculiar characteristic odor and a sweetish pungent taste, and boils at 37° C. (98.6° F.), the normal body temperature. It should be kept in a cool place, remote from light and fire, in glass-stoppered bottles or in sealed cans. Ether should have a neutral reaction, but if kept for a long time in containers only partially filled it develops acetic acid and becomes acid in reaction. Only in its purest form should it be used as an anesthetic. The simplest and most reliable tests to determine its purity are its specific gravity (0.725), its rapid and complete volatility, its low boiling point, and its freedom from acidity. An excess of water in ether may be discovered by shaking it with an equal bulk of carbon disulphide, when it should remain perfectly clear. The presence of alcohol may be detected by placing a piece of potassa in ether for twenty-four hours, when, if alcohol is present, the potassa becomes coated with a yellowish film and the liquid becomes yellow in color. The presence of aldehyde and allied products may be detected by mixing ether with one-tenth

its volume of normal potassium hydroxide solution, shaking occasionally during an hour, when, if any of these substances are present, the liquid will become dark in color.

Action and Uses.—Ether is a *stimulant* to the circulation and respiration, except in overdoses, when it becomes a depressant; it is an *antispasmodic* and *carminative*, and when administered by inhalation is a *general anesthetic*. Ether is used chiefly by inhalation as an anesthetic. When the vapor of ether is inhaled freely it gives rise to a preliminary stage of excitement, followed by deep sleep and relaxation, during which the subject is insensible to pain. Nausea, vomiting, and headache are common after-effects.

The first public demonstration of its general anesthetic properties was by Dr. Morton in the Massachusetts General Hospital at Boston, in 1844. Dr. Crawford Long, of Georgia, is said to have performed several minor surgical operations under ether anesthesia as early as 1842, but failed to publish the fact. The words *anesthetic* and *anesthesia* were coined by Oliver Wendell Holmes shortly after Morton's discovery and demonstration. On account of its highly volatile property, when *administered* by mouth ether should be given in ice water, and on account of the inflammability of its vapor should be handled most cautiously in the presence of an open fire or flame.

Dose.—0.6 to 4 Cc.; 10 to 60 minims.

Official Preparations

Spiritus Ætheris (*Spirit of Ether*).—A colorless, mobile, volatile liquid made by mixing 32.5 Cc. of Ether with 67.5 Cc. of Alcohol.

It is used as a diffusible stimulant, antispasmodic and carminative. It should be *administered* in *cold* water.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Spiritus Ætheris Compositus (*Compound Spirit of Ether*). *Synonym*, Hoffman's Anodyne.—A colorless, mobile, volatile liquid, made by dissolving 25 Cc. of heavy Oil of Wine in a mixture of 325 Cc. of Ether and 650 Cc. of Alcohol. Upon its addition to water, the heavy oil is partially separated from solution and forms a milky or cloudy mixture. Compound spirit of ether is a rapidly acting stimulant, antispasmodic and carminative. It should be *administered* in cool water.

Dose.—2 to 4 Cc.; ½ to 1 f℥.

ÆTHER ACETICUS—Acetic Ether

Acetic ether is a transparent, colorless, volatile, and inflammable liquid, composed of about 90 per cent. by weight of Ethyl Acetate ($CH_3CO.OH_2H_5$), and about 10 per cent. of alcohol containing a little water. Its odor is fragrant and refreshing, slightly acetous; its taste acetous and burning; it is soluble in about 9 parts of water, and is

miscible in all proportions of alcohol, ether, fixed and volatile oils. It may be made by distilling a mixture of alcohol and acetic acid and purifying the distillate.

Action and Uses.—Acetic ether is a *stimulant, antispasmodic,* and *carminative,* but is somewhat slower and more continuous than ether. It should be *administered* in cold water.

Dose.—1 to 2 Cc.; 15 to 30 minims.

ÆTHYLIS CARBAMAS—Ethyl Carbamate

Synonym, Urethane. *Formula,* $C_3H_7NO_2 = 88.42$.

An ester of carbamic acid obtained by the action of ethyl alcohol upon urea (carbamide), or one of its salts. It is seen as colorless, crystalline scales, or columnar crystals, without odor, and having a cooling saline taste. It is freely soluble in water, alcohol, and glycerin.

Action and Uses.—Ethyl carbamate is a *hypnotic* which in medicinal doses has but little effect upon the circulation or respiration. It is applicable to cases of *nervous* or *functional insomnia,* but is not suited to cases of insomnia due to pain. It may be *administered* in powders, capsules, or in solution, made agreeable by any of the flavoring syrups.

Incompatibilities.—Ethyl carbamate is decomposed by alkalies; a liquid results when it is triturated with antipyrine, camphor, hydrated chloral, menthol, thymol, phenol, phenyl salicylate, salicylic acid, resorcinol, or benzoic acid; in alcoholic solution, with potassium hydroxide it produces crystals of potassium cyanide.

Dose.—0.6 to 2 Gm.; 10 to 30 grains.

ÆTHYLIS CHLORIDUM—Ethyl Chloride

Formula, $C_2H_5Cl = 64.00$.

Ethyl chloride is a colorless, mobile, very volatile liquid, having a characteristic, rather agreeable odor and a burning taste. It is so highly volatile that it is almost invariably dispensed in sealed glass tubes, so arranged that upon removal of a cap from the end of the tube the liquid is sprayed out in a fine stream.

Action and Uses.—Ethyl chloride when sprayed upon the skin evaporates so rapidly that intense cold is produced, and the part sprayed is quickly frozen and rendered anesthetic. Its use in this manner permits minor operations to be performed under the *local anesthetic* effect of the drug.

When administered by inhalation, the drug produces profound sleep, unconsciousness, relaxation, and insensibility to pain; it is not looked upon as a safe general anesthetic suitable for prolonged anesthesia.

ALCOHOL—Alcohol

Synonym, Ethyl Alcohol.

Alcohol is a colorless, mobile, volatile, inflammable liquid, containing 92.3 per cent. by weight, or 94.9 per cent. by volume, of ethyl alcohol (C_2H_5OH), and about 7.7 per cent. by weight of water. It is made by malting, fermenting, and distilling grain or other amylaceous substances. Ethyl alcohol has an agreeable odor, a burning taste; burns with a pale blue, hot, smokeless flame; boils at 78° C. (172.4° F.), is freely miscible with water, chloroform, ether, or carbon disulphide, and is a *good solvent* for fixed oils, fats, resins, and alkaloids. It is *not a good solvent* for gums or the various mineral salts, and will precipitate them from strong aqueous solutions; it is decomposed by chromic acid and potassium permanganate. When alcohol and water are mixed in equal volumes, heat is developed, and the resultant liquid is less in bulk than that of the two before mixing.

Action and Uses.—Alcohol is a food, a stimulant to the circulation and to gastric digestion, and an excitant to the brain. It is an antiseptic and antiferment. When diluted with water it forms an agreeable lotion to *reduce fevered temperature, cleanse the skin,* and *prevent* and *heal bed sores.* By reason of its solvent and preservative properties it is used in the manufacture of many pharmaceutical preparations, such as tinctures, fluidextracts, and spirits. Wood alcohol, a methyl alcohol which is highly toxic, should never be used as a substitute for alcohol, except for preserving anatomical specimens, or as a fuel.

In the form of whisky, brandy, and wine, alcohol is employed as a rapidly acting *stimulant* to overcome *shock, syncope, exhaustion,* and *fainting.* In exhausting diseases, such as *typhoid fever* and *pneumonia,* it is employed as a food and to assist feeble digestion.

Official Preparations

Alcohol Absolutum (*Absolute Alcohol*).—Made by dehydrating the purest and strongest alcohol, by percolating it, out of the presence of air, through recently burnt lime, and redistilling the percolate in a vacuum. It should not contain more than 1 per cent. of water, and, being hydroscopic, should be kept in well-stoppered sealed containers. This form of alcohol is not used as a medicine, but for scientific purposes.

Alcohol Deodoratum (*Deodorized Alcohol*).—Prepared by distilling alcohol over pure fused sodium acetate. It is composed of 92 per cent. by weight, or 95.1 per cent. by volume, of Ethyl Alcohol, and 7.5 per cent., by weight, of water. Used in the manufacture of colognes and flavoring agents.

Alcohol Dilutum (*Diluted Alcohol*).—Made by mixing equal quantities, by volume, of alcohol and water. It contains 41 per cent. by weight, or

48. 6 per cent. by volume, of Ethyl Alcohol, and 59 per cent by weight of water.

Spiritus Frumenti (*Whisky*).—An alcoholic liquid distilled from the mash of barley, wheat, rye, or corn, and containing from 44 to 55 per cent. by volume, or 37 to 47.5 per cent. by weight, of Ethyl Alcohol, and at least four years old. Its amber color is due to coloring matter, some sugar, and tannin derived from the tank in which it has been kept. Raw whisky is harsh to the taste, but becomes mellow with age, this process being brought about by the formation of compound ethers in it. During the process of aging or mellowing in casks, whisky purifies itself, by the oxidation of fusel oil and allied products, and forms agreeable compound ethers. Much of the whisky upon the market is impure and unfit for medicinal purposes. These impurities consist of fusel oil, undue amounts of solids, added sugar, glycerin, spices, and sometimes cayenne pepper, the most injurious of these being fusel oil. These impurities may be detected by slowly evaporating 100 Cc. of whisky over a water bath; when the last portion volatilizes, it should not have a harsh, disagreeable odor, showing a freedom from all but traces of fusel oil. The residue fully dried at the temperature of boiling water should not weigh more than 0.5 Gm., nor have a sweet or distinctly spicy taste, showing the absence of an undue amount of solids and added sugar, glycerin, spices, or pepper. Not more than 1.2 Cc. of normal potassium hydroxide solution should be required to neutralize 100 Cc. of whisky, showing the absence of excessive acidity.

Uses.—Whisky is a digestive stimulant, antispasmodic, and local antiseptic. It is valued by many in the later stages of *low fevers* and *exhausting diseases;* such as *typhoid fever;* but as a drug, used in the treatment of disease, it is useful in a very limited number of cases. Unwise or careless use by the sick of alcoholic stimulants may be, and has been in the past, the beginning of the alcohol habit in some instances.

Spiritus Vini Gallici (*Brandy*).—Made by distilling the fermented, unmodified juice of grapes. It contains from 39 to 47 per cent. of Alcohol, is only slightly acid, and should be free from fusel oil, added sugar, glycerin, and aromatic substances. Brandy should be at least four years old before it is suitable for medicinal uses.

Action and Uses.—The action and uses of brandy are similar to those of whisky.

Spiritus Juniperi Compositus (*Compound Spirit of Juniper*). *Synonym,* Gin.—A nearly colorless liquid, made by dissolving the Oils of Juniper, Caraway, and Fennel in 1400 Cc. of Alcohol, and adding Water to make 2000 Cc. of the finished product.

Uses.—An alcoholic *stimulant,* also used as a *carminative, antispasmodic,* and *diuretic.*

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Vinum Album (*White Wine*).—A pale, amber-colored liquid containing not less than 7 nor more than 12 per cent. by weight of Alcohol, made by fermenting the juice of fresh grapes, freed from their seeds, stems, and skins, and subjected to the usual cellar treatment for fining and aging.

Action and Uses.—Used in medicine as a mild alcoholic stimulant, and in pharmacy in preparing the medicated wines.

Vinum Rubrum (*Red Wine*).—A deep red liquid containing not less than 7 nor more than 12 per cent. of Alcohol, made by fermenting the juice of fresh red-colored grapes in the presence of their seeds and skins and subjected to the usual cellar treatment for fining and aging. Aside from its use in medicine as a mild alcoholic stimulant, red wine is used in pharmacy for preparing wine of coca.

ALOE—Aloes

Family, Liliaceæ.

Aloes is an inspissated juice derived from the leaves of a plant belonging to the lily family, growing principally in the Indies, and known officially as *Aloe Socotrina* and *Aloe Barbadensis*. Both varieties are brought into the market in hard orange-brown or yellowish-brown masses, having a saffron-like odor and a bitter taste. In its impure state aloes contains fragments of leaves, small stones, pieces of skin, earth, and other extraneous matter, so that, for medicinal purposes, the Purified Aloes only should be employed.

Aloe contains a neutral, bitter purgative principle known as *Aloin;* that from barbadensis is known as *Barbaloin,* and that from socatrina as *Socaloin.*

Action and Uses.—Aloes, and its active principal aloin, is a slow acting *purgative* which affects chiefly the lower bowel. If long continued, it is said to give rise to atony of the bowels, thereby leading to more obstinate constipation. Another objection to the use of the drug as a purgative is that it causes considerable griping, and that its habitual use is thought by many to produce hemorrhoids. When taken by nursing women, it is in part eliminated in the milk and will purge the nursling. The drug is not suitable as a quick acting hydragogue purge, but is employed as a slow-acting *laxative.* It is rarely given alone, but appears to act best when combined with other laxatives. Its griping effect may be overcome, in part at least, by combining with it a small quantity of extract of hyoscyamus. On account of its persistent, intensely bitter taste, it is best given in pills. In combination with myrrhæ, and also with iron, it is used in the treatment of *amenorrhœa.* In *anemia,* in combination with iron, not only does it overcome the constipating effect of iron, but promotes its absorption. It is used in making Purified Aloes, and Extract of Aloes.

Dose.—0.13 to 0.6 Gm.; 2 to 10 grains.

Official Preparations

Extractum Aloes (*Extract of Aloes*).—A dry extract made by dissolving aloes in boiling water, straining, clarifying, and evaporating.
Dose.—0.03 to 0.3 Gm.; ½ to 2 grains.

Aloe Purificatum (*Purified Aloes*).—Purified aloes is made by melting 16 ounces of Socotrina Aloes by means of a water bath, adding 3 ounces of alcohol, stirring thoroughly, straining through a fine sieve which has just been dipped into boiling water, and evaporating with constant stirring over a water bath until a thread of the mass becomes brittle upon cooling.

Official Preparations from Purified Aloes

Pilulæ Aloes (*Pills of Aloes*).—Each pill contains: Purified Aloes, about 2 gr. (0.13 Gm.); Soap, about 2 gr. (0.13 Gm.); Water, sufficient quantity.
Dose.—1 to 3 pills.

Pilulæ Aloes et Ferri (*Pills of Aloes and Iron*).—Each pill contains: Purified Aloes, about 1⅙ gr. (0.7 Gm.); Exsiccated Ferrous Sulphate, about 1⅙ gr. (0.7 Gm.); Aromatic Powder, about 1⅙ gr. (0.7 Gm.); Confection of Rose, sufficient quantity.
Dose.—1 to 3 pills.

Pilulæ Aloes et Mastiches (*Pills of Aloes and Mastic*). *Synonym*, Lady Webster's Dinner Pill.—Each pill contains: Purified Aloes, about 2 gr. (0.13 Gm.); Mastic, about ⅔ gr. (0.04 Gm.); Red Rose, about ½ gr. (0.03 Gm.); Diluted Alcohol, sufficient quantity.
Dose.—1 to 3 pills.

Pilulæ Aloes et Myrrhæ (*Pills of Aloes and Myrrh*)—Each pill contains: Purified Aloes, about 2 gr. (0.13 Gm.); Myrrh, about 1 gr. (0.06 Gm.); Aromatic Powder, about ¾ gr. (0.04 Gm.); Syrup, sufficient quantity.
Dose.—1 to 3 pills.

Tinctura Aloes (*Tincture of Aloes*).—Prepared by macerating 10 Gm. of Purified Aloes and 20 Gm. of Glycyrrhiza with enough Diluted Alcohol to make 100 Cc. of tincture. The tincture is intensely and persistently bitter.
Dose.—2 to 8 Cc.; ½ to 2 f℥.

Tinctura Aloes et Myrrhæ (*Tincture of Aloes and Myrrh*).—Prepared by macerating 10 Gm. each of Purified Aloes, Myrrh, and Glycyrrhiza with a sufficient quantity of menstruum, Alcohol, 3 parts, and Water, 1 part, to make 100 Cc. of tincture. The tincture is intensely and persistently bitter.
Dose.—2 to 8 Cc.; ½ to 2 f℥.

Purified aloes also enters into the following official preparations: Compound Extract of Colocynth; Compound Pills of Rhubarb; Compound Tincture of Benzoin.

Derivative of Aloes

Aloinum (*Aloin*).—A neutral principle obtained from *Aloes*. It is a microcrystalline powder or minute acicular crystals, lemon-yellow to dark yellow in color; intensely bitter, slightly hygroscopic, almost completely soluble in 120 parts of water and 15 parts of alcohol, and is neutral in reaction. Aloin is a purgative; being intensely bitter it should be *administered* in granules, pills, or capsules. It enters into the formula of Compound Laxative Pills.

Dose.—0.015 to 0.06 Gm.; $\frac{1}{4}$ to 1 grain.

ALTHÆA—Althæa

Synonym, Marshmallow. *Family,* Malvaceæ.

The dried root of *Althæa officinalis,* collected from plants of the second year's growth and deprived of the outer bark. It is usually seen in tapering pieces from 6 to 12 inches (15 to 30 cm.) in length, and $\frac{3}{4}$ of an inch (20 mm.) in diameter. Externally it is whitish, transversed longitudinally by several broad shallow furrows, and covered with loose woody fibers. Internally it is yellowish-white, has a faint odor and a sweetish, mucilaginous taste. It contains large quantities of mucilaginous principles.

Uses.—Althæa is employed exclusively as a demulcent. There are no official preparations of it, but a mucilage may be made by pouring about a pint of water over an ounce of the drug.

Dose.—Any quantity.

ALUMINUM COMPOUNDS

Aluminum is a silver-white, very light metal found extensively in combination with silicic acid as a constituent of crystalline rocks, clays, and slates. A native aluminum silicate clay is known officially as *Kaolin.* Several salts of the metal are official; they are mostly soluble in water, insoluble in alcohol, while all are astringent and styptic in action. The soluble salts of aluminum are precipitated as aluminum hydroxide by potassium hydroxide, sodium hydroxide, ammonia water, and alkali carbonates. The metal is not official.

Official Salts

Alumen (*Alum*). *Formula,* $KAl(SO_4)_2 + 12H_2O = 471.02$.—Alum made by treating alum clay with sulphuric acid, adding potassium

sulphate, and crystallizing the salt from solution. It is seen as large, colorless, octahedral crystals, or in crystalline fragments, without odor, but having a sweetish and strongly astringent taste. It is soluble in 9 parts of water, insoluble in alcohol, and acid in reaction.

Action and Uses.—Alum, in concentrated form, is a mild cauterant; in solution, it is an irritant, astringent, and styptic. Crystals of alum are applied to unhealthy ulcers, to destroy *unhealthy granulations*, to control *oozing hemorrhages*, such as *bleeding from the nose or gums;* as a gargle to *shrink the uvula* when it is *œdematous*, and as a wash to control *profuse sweating* and *harden* the *skin*. Dissolved in water, alum may be employed to control *gastric hemorrhage*, control *diarrhœa*, and as an emetic. The drug is also employed as an emetic.

Dose.—4 to 16 Gm., 1 to 4 ʒ, as an emetic; 0.3 to 1 Gm., 5 to 15 grains, for other conditions.

Alumen Exsiccatum (*Exsiccated Alum*). *Synonym*, Burnt Alum. *Formula*, $KAl(H_2SO_4)_2 = 256.46$.—Exsiccated alum is a white granular powder, without odor, having a sweetish, astringent taste, and attracting moisture upon exposure to air. It is slowly but completely soluble in 17 parts of water and insoluble in alcohol. Exsiccated alum is prepared by driving off the water of crystallization from alum by subjecting it to a moderate, dry heat.

Action and Uses.—In powdered form, exsiccated alum is a mild caustic. It is used locally to destroy unhealthy granulations upon *foul ulcers*.

Alumini Hydroxidi (*Aluminum Hydroxide*).—Aluminum hydroxide is a light, white amorphous powder, made by precipitation, by adding a solution of sodium carbonate to a solution of alum. It is tasteless, odorless, permanent in air, and insoluble in water or alcohol.

Uses.—Aluminum hydroxide is used locally as a dusting powder in treating *chafing* and *intertrigo*.

Alumini Sulphas (*Aluminum Sulphate*). *Formula*, $Al_2(SO_4)_3 + 16H_2O = 625.93$.—Aluminum sulphate is a white, crystalline powder, shining plates or crystalline fragments, without odor, having a sweetish, afterward an astringent taste, and permanent in air. It is soluble in 1 part of water, but insoluble in alcohol.

Action and Uses.—Aluminum sulphate in solution is a styptic and antiseptic; an aqueous 2 per cent. solution is useful as an *antiseptic astringent* wash for *foul ulcers*.

AMMONIA PREPARATIONS

Ammonia, NH_3, is a colorless, pungent irrespirable gas, irritating to the eyes, to the mucous membranes, and, in concentrated solution, to the skin. The gas is strongly alkaline, and when brought in contact with acids is neutralized forming salts of ammonium. Water absorbs

large volumes of the ammonia and acquires a strongly alkaline reaction, and takes on the pungent odor and irritating action of the gas. The gas may be generated by heating a mixture of calcium oxide and ammonium sulphate; commercially it is obtained from gas liquor. The gas is not used in medicine, but solutions of it in water and alcohol are extensively employed in medicine, in pharmacy, and as a domestic article.

Action and Uses.—When the vapor of ammonia is inhaled in small quantities, it irritates the respiratory passages, and also acts as a powerful fleeting stimulant to the circulation and respiration. If concentrated solutions of the gas are applied to the skin they stimulate and irritate it, and, if confined to the skin under a watch crystal, produce a blister. They are too irritating to be used hypodermically, except in cases of greatest emergencies. The liquid preparations of ammonia, when taken internally, if concentrated, are irritants to all mucous membranes with which they come in contact; if well diluted, they are rapidly absorbed and act as powerful, although fleeting, stimulants to the circulation and respiration. They also stimulate and liquefy bronchial secretion. The preparations of ammonia, all of which are liquids, are used locally to *relieve the pain of stings from insects*, as counterirritants, and internally as rapidly acting stimulants in treating *shock, syncope, fainting;* as expectorants in *subacute bronchitis*, and to relieve *gastric hyperacidity*.

All preparations of ammonia should be freely diluted with water at the time of administering. The liquid preparations of ammonia form chemical combinations with fixed oils and fats, rendering them soluble, and are, therefore, popular in the household as cleansing agents.

Poisoning.—The vapor from ammonia preparations, if inhaled too freely or in concentrated form, produces inflammation of the nasal passages and the larynx, followed by œdema of the glottis, bronchitis, pulmonary œdema, and sometimes catarrhal pneumonia; if taken by the mouth in concentrated form or in excessive quantities, it produces inflammation, swelling, and pain of the mouth, tongue, larynx, œsophagus, and stomach; œdema of the glottis or lungs may develop some hours after the poison has been taken.

Treatment of Poisoning. — The treatment for poisoning from ammonia consists in the administration of weak acids, such as vinegar, lemon juice, and orange juice, to neutralize the alkali; bland oils and milk, to soothe the inflamed parts, and, if necessary, opiates to relieve pain. Persons severely poisoned by taking ammonia, or by inhaling the concentrated vapor, should be kept under observation for a number of hours, as œdema of the glottis and lungs may come on some hours after poisoning has occurred.

Incompatibilities.—The preparations of ammonia are neutralized by acids; they are oxidized to potassium nitrate by potassium permanganate; they precipitate the soluble salts of antimony, aluminum, bismuth, copper, iron, manganese, and zinc; they precipitate many of

the alkaloids from aqueous solutions of their salts; they form soluble salts with bromine, iodine, and chlorine; they change the chemical character of calomel, producing with it a black compound; they decompose hydrated chloral, forming chloroform. Precipitation of alkaloids is less likely from alcoholic than aqueous preparation of ammonia, free alkaloids being much more soluble in alcohol than in water.

Official Preparations

Aqua Ammoniæ (*Ammonia Water*). *Synonyms*, Hartshorn; Ammonium Hydroxide.—A colorless, aqueous liquid, containing 10 per cent., by weight, of ammonia gas. It is made by passing gaseous ammonia into water. It has a strongly alkaline reaction, a pungent, characteristic odor, and a caustic, alkaline taste. Water of ammonia is but little used as a medicine, but is employed in pharmacy.

It enters into the process for making many of the scale salts of iron, and of bismuth and ammonium citrate; it is a solvent for glycyrrhizin, and therefore is added to the menstruum for exhausting glycyrrhiza of its sweet principle; it is also used in preparing Aromatic Spirit of Ammonia, and Liniment of Ammonia. If desired, when well diluted with water, it may be administered as a quickly acting stimulant in *shock*, *collapse*, *fainting*, or in *gastric hyperacidity*. It is popular as a household article useful for cleaning.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

Aqua Ammoniæ Fortior (*Stronger Ammonia Water*).—An aqueous solution of ammonia containing 28 per cent. by weight of gaseous Ammonia. It is powerfully alkaline, pungent, and irritating.

Stronger ammonia water is never administered internally, but may be used externally as a vesicant. It should be kept in glass-stoppered bottles in a cool place, and handled with extreme caution.

Spiritus Ammoniæ (*Spirit of Ammonia*).—A colorless, alcoholic liquid containing 10 per cent., by weight, of gaseous ammonia, and 90 per cent., by weight, of Alcohol; made by passing a stream of ammonia into alcohol. It is alkaline, pungent, and irritating. Spirit of ammonia is used as a *stimulant* and *antacid*. When *administered*, it should be well diluted with water.

Dose.—0.6 to 4 Cc.; 10 to 60 minims.

Spiritus Ammoniæ Aromaticus (*Aromatic Spirit of Ammonia*).—A clear, colorless or slightly yellowish, aromatic, alkaline, alcoholic liquid, containing Ammonium Carbonate, Ammonia Water, Oil of Lemon, Oil of Lavender, Oil of Nutmeg, Alcohol, and Distilled Water. When added to water, it becomes cloudy or milky, owing to the separation of the volatile oils.

Action and Uses.—This is the most popular and agreeable preparation of ammonia for medicinal use. When inhaled or taken by the mouth, the preparation is a rapidly acting stimulant and an antacid;

locally, it is mildly irritating and antacid. It is *used* by inhalation and by mouth as a stimulant to overcome *shock*, *syncope*, and *fainting*. When using this and other preparations of ammonia as an inhalant, care should be taken not to continue the inhalation for too long a time, or in too great a state of concentration as it may give rise to violent inflammation of the air passages. When given by the mouth, all preparations of ammonia should be well diluted, and, as their effects are of brief duration, they should be administered frequently if the patient is to be kept under the influence of the remedy. Hypodermic injections of any of the preparations of ammonia should be employed only in cases of extreme urgency, as they are highly irritating, painful, and may cause sloughing of the tissues. Aromatic spirit of ammonia is used as a menstruum in preparing Ammoniated Tincture of Guaiac and Ammoniated Tincture of Valerian.

Dose.—0.6 to 4 Cc.; 10 to 60 minims.

Linimentum Ammoniæ (*Ammonia Liniment*). *Synonym*, Volatile Liniment, Hartshorn Liniment.—A white, strongly alkaline liquid soap, made by well mixing in a bottle 35 Cc. of Ammonia Water, 5 Cc. of Alcohol, 3 Cc. of Oleic Acid, and 60 Cc. of Cottonseed Oil.

Uses.—Ammonia liniment is used locally by inunction as a counter-irritant. Cloths saturated with ammonia should *not* be bound about the joints or upon the skin; if used in this way, it is liable to produce blisters which heal with difficulty.

AMMONIUM SALTS AND COMPOUNDS.

Ammonium (NH_4), a hypothetical base, does not exist in a free state, but in combination with various acids forms salts. Those official are ammonium benzoate, bromide, carbonate, chloride, iodide, citrate, valerate, salicylate, and, in solution, ammonium acetate. They are all freely soluble in water, except the benzoate, which is hardly sufficiently so to be suitable for dispensing in water or aqueous liquids. With the exception of the carbonate, ammonium salts do not have the odor of ammonia, nor are they actively stimulating to the circulation or respiration. The chief value of the ammonium base consists in being a carrier for the positive element with which it is combined to form the salt. In combination with potassium, sodium, or calcium hydroxides, the ammonium salts liberate gaseous ammonia.

Official Salt

Ammonii Benzoas (*Ammonium Benzoate*). *Formula*, $NH_4C_7H_5O_2$ = 138.06.—Ammonium benzoate is seen in thin, white, laminar crystals, or as a crystalline powder, having a slight odor of benzoic acid, and a bitter, saline, slightly acrid after-taste. It is *soluble* in 10.5 parts of water and 25 parts of alcohol. The salt should be neutral in reaction,

but occasionally an acid salt is met with which is far less soluble and does not otherwise fulfil the requirements of the pharmacopœial salt. It is made by the action of benzoic acid upon ammonia water.

Action and Uses.—Ammonium benzoate when administered is eliminated in the urine as hippuric acid and nitric acid, thereby increasing the normal acidity of the urine, or overcoming alkalinity if present. In this respect its action is similar to benzoic acid. It is somewhat less irritating to the stomach and more soluble than benzoic acid. It is best *prescribed* in cachets.

Incompatibilities.—The salt is decomposed by mineral acids, liberating benzoic acid. It precipitates the salts of iron, lead, silver, mercury, quinine sulphate, and quinine bisulphate.

Dose.—0.6 to 2 Gm.; 10 to 30 grains.

Ammonii Bromidum (*Ammonium Bromide*). *Formula*, NH_4Br = 97.29.—Ammonium bromide is seen in transparent, prismatic crystals or as a white crystalline, odorless powder, having a pungent, saline taste; usually made by the action of bromine upon ammonia water. It is *soluble* in 1.2 parts of water and 12.5 parts of alcohol. Upon exposure to damp air the salt acquires a yellowish color, becoming damp and also acid in reaction.

Action and Uses.—The action and uses of this salt are practically the same as that of other alkali bromides. It is a depressant to the brain and spinal cord, and therefore a remedy of considerable value as a nerve sedative, useful for the relief of *insomnia, headache, hysterical outbreaks, epilepsy,* and other conditions of nervous irritability.

When taken in large doses for a considerable length of time, ammonium bromide gives rise to acne, coryza, mental hebetude, as do most bromides. (See *Bromine.*) It differs from potassium bromide in being less agreeable to the taste, somewhat more irritating to the stomach, and in not being a depressant to the heart. Its tendency to undergo change makes it unsuitable for administering in the form of powder. The most suitable *method of prescribing* the chemical is in an aqueous solution along with a small quantity of syrup and fluidextract of glycyrrhiza. On account of its acidity, commercial spirit of nitrous ether decomposes this salt with the liberation of bromine, and therefore, when it is desired to combine these two remedies in the same prescription, spirit of nitrous ether which has become acid in reaction from long and improper keeping should not be employed.

Dose.—0.6 to 4 Gm.; 10 to 60 grains.

Ammonii Carbonas (*Ammonium Carbonate*). *Synonym*, Sal Volatile. *Formula*, $C_2H_{11}N_3O_5$ = 156.01.—A white, hard, translucent mass, having a strong odor of ammonia, a strongly alkaline reaction, a pungent, saline, caustic taste. When exposed to air, it gives off ammonia gas and carbon dioxide, and gradually crumbles into powder. It is slowly but completely *soluble* in 4 parts of water, and is decomposed by hot water. The salt is only partially soluble in alcohol. In contact with

acids it readily decomposes with effervescence, carbon dioxide being eliminated. On account of its efflorescent properties, it should be kept in tightly stoppered bottles. The salt is of rather indefinite chemical composition, and is more of a carbamate than carbonate. It is made by subliming a dry mixture of ammonium sulphate with calcium carbonate.

Action and Uses.—The action and uses of this salt of ammonium are the same as those of the ammonia preparations, being a stimulant to the heart and respiration, an expectorant and irritant to the mucous membranes. It is *used* as a stimulant in *pneumonia, shock,* and other cases of circulatory depression, where a rapidly acting stimulant is required. Its action is rapid but comparatively brief, although more permanent than aromatic spirit of ammonia. The best *method for prescribing* it is in aqueous solution in combination with the mucilage or syrup of acacia. At the time of administering it should be well diluted with water.

Incompatibilities.—Ammonium carbonate is incompatible with syrup of squill, and all other liquids which are acid in reaction, all of which decompose it and liberate carbon dioxide, and with soluble compounds of iron, which are precipitated from solution by it.

Dose.—0.06 to 0.6 Gm.; 1 to 10 grains.

Ammonii Chloridum (*Ammonium Chloride*). *Synonym,* Sal Ammoniac. *Formula,* NH_4Cl = 58.11.—A white, crystalline or granular powder, free from odor, and having a cooling saline taste. It is permanent in dry air, deliquescent in moist atmosphere, *soluble* in 3 parts of water, and almost insoluble in alcohol. The salt is usually obtained by purifying crude ammonium chloride, the latter being made by acting upon gas liquor with hydrochloric acid.

Action and Uses.—Ammonium chloride is a stimulating expectorant, and is extensively employed in the second stage of *bronchitis.* It is also valuable in treating *catarrhal conditions of other mucous membranes,* and is also useful in *hepatic torpor.* The salt is best *prescribed* in compressed tablets or in aqueous solution along with fluidextract of glycyrrhiza or some other liquid preparation of glycyrrhiza for the purpose of disguising its salty taste. Troches of ammonium chloride (*Trochisci Ammonii Chloridi*) are official, and contain about $1\frac{3}{4}$ grains (0.10 Gm.) of ammonium chloride, along with extract of glycyrrhiza, tragacanth, sugar, and syrup of tolu.

Incompatibilities.—Alkalies, alkali earths and their carbonates, tartaric and mineral acids decompose ammonium chloride.

Dose.—0.3 to 1 Gm.; 5 to 15 grains.

Ammonii Iodidum (*Ammonium Iodide*). *Formula,* NH_4I = 143.83.—Minute, colorless, cubical crystals, or a white, granular powder, free from odor, and having a sharp, saline taste. The salt is rather unstable and readily liberates ammonia and iodine, becoming yellow or reddish, when it is then no longer suitable for medicinal use. Upon exposure

to the air it is deliquescent; it is *soluble* in 0.6 part of water and 9 parts of alcohol. Aqueous solutions should not change the color of litmus paper, showing it to be neutral in reaction.

It is made by double decomposition between solutions of potassium iodide and ammonium sulphate.

Action and Uses.—Like other iodides, this salt is a powerful alterative, producing destructive metamorphosis. It is somewhat more irritating to the mucous membrane than potassium or sodium iodides. When taken in full doses for a consecutive number of days, it often produces a condition known as *iodism*, characterized by coryza, painful acne of the face and body and mucous membrane of the mouth, sore throat, a disagreeable metallic taste, slight nausea, indigestion, and increased salivation. If not discontinued or reduced in dose, when these symptoms appear, they become greatly exaggerated, and when continued for a long time, atrophy of the testicles or mammæ may follow. The symptoms of iodism are less likely to develop in patients from whose diet sodium chloride is withdrawn during the time iodides are being administered. Small doses of solution of potassium arsenite given along with the iodides also lessen the tendency to acne. Ammonium iodide is used for the same class of cases and for like purposes as other alkali iodides in the treatment of *secondary* and *tertiary syphilis, glandular enlargement, chronic inflammation of mucous membranes, delayed resolution in pneumonia, asthma,* and *rheumatism.* It is not suitable for dispensing in the form of powders, but is *best given* in a saturated aqueous solution to be administered in milk. Another suitable way of prescribing the salt is in an aqueous solution along with mucilage of acacia and fluidextract of glycyrrhiza.

Incompatibilities.—Ammonium iodide is incompatible with mineral acids, alkaloids, alkaline earths and their carbonates, and the soluble salts of silver and lead. It precipitates the soluble salts of mercury, forming red mercuric iodide, which is redissolved by an excess of ammonium iodide.

Dose.—0.13 to 1 Gm.; 2 to 15 grains.

Ammonii Salicylas (*Ammonium Salicylate*). *Formula,* $NH_4C_7H_5O_3 = 153.94$.—Usually seen as a white, crystalline powder, having a slightly saline, bitter taste, and a sweetish after-taste. It is *soluble* in 0.9 parts of water and 2.3 parts of alcohol. It is usually made by the action of salicylic acid upon ammonium carbonate.

Action and Uses.—Ammonium salicylate, like salicylic acid, when given in full doses for several days, or in several large doses, produces vertigo, ringing in the ears, and, unless some special precautions are taken, gastric irritability. This and other alkali salicylates are much more soluble and less irritating to the mucous membrane of the stomach and kidneys than is salicylic acid. Being permanent in air, the salt may be prescribed in powders, capsules, or compressed tablets, but being soluble in less than its weight of water, may be given in a saturated

solution and administered in milk, as is customary with potassium iodide. Its uses are similar to those of other salicylates.

Incompatibilities.—Ammonium salicylate is incompatible with mineral acids, ferric salts and solutions, concentrated solution of strontium salts, and the solutions of the more soluble salts of quinine.

Dose.—0.3 to 2 Gm.; 5 to 30 grains.

Ammonii Valeras (*Ammonium Valerate*). *Formula*, $NH_4C_5H_9O_2$ = 118.24.—A white or colorless, crystalline salt having the disagreeable odor of valeric acid and a sharp sweetish taste. It is freely *soluble* in water and alcohol, and deliquescent in moist atmosphere. The salt is obtained by passing dried gaseous ammonia into monohydrated valeric acid.

Action and Uses.—Ammonium valerate is a sedative to the nervous system and is employed as such in *hysteria*, *nervous excitement*, and *nervous insomnia*. Its extremely disagreeable odor and taste mitigate against its use in many cases. Being deliquescent, it should not be *prescribed* in powders, pills, or compressed tablets.

Dose.—0.3 to 1 Gm.; 5 to 15 grains.

Liquor Ammonii Acetatis (*Solution of Ammonium Acetate*). *Synonym*, Spirit of Mindererus.—Ammonium acetate is so deliquescent that it is not practical to form it into a salt. Solution of ammonium acetate is a clear, colorless liquid, of a mildly saline, acidulous taste and an acid reaction, contains about 7 per cent., by weight, of ammonium acetate (CH_3COONH_4) in aqueous solution. It is made by gradually adding 5 Gm. of ammonium carbonate (which should be in translucent pieces, free from white pulverulent bicarbonate) to 100 Cc. of diluted acetic acid. The solution should be freshly made when wanted.

Action and Uses.—Solution of ammonium acetate is a mild diaphoretic, useful in *acute infectious diseases* accompanied by *fever*. It should be *administered* in cool water.

Dose.—4 to 15 Cc.; 1 to 4 f℥.

AMYGDALA AMARA—Bitter Almond

Family, Rosaceæ; variety, Amara.

The ripe seed of the almond fruit taken from *Prunus amygdalus*, a small tree indigenous to Asia, Persia, Marmosa, and also extensively and successfully cultivated in southern Europe and along the Mediterranean basin.

The seeds contain a large quantity of fixed oil, volatile oil, a glucoside known as *amygdalin*, and a ferment known as *emulsin*. In the presence of moisture and heat, emulsin reacts upon amygdalin, decomposing it into glucose and hydrocyanic acid.

Action and Uses.—The oil of bitter almond and preparations made from it are highly toxic, possessing the depressing and sedative effect

of diluted hydrocyanic acid. The volatile oil of bitter almond and preparations made from it are used as a flavoring agent and as an antispasmodic. It is looked upon as of value, and is considerably used to allay *irritating, spasmodic cough.*

Poisonous Action.—Oil of bitter almond and preparations made from it are highly poisonous, giving rise to the symptoms similar to poisoning by diluted hydrocyanic acid, and are to be treated in the same manner as poisoning from that acid. (See Acidum Hydrocyanicum Dilutum.)

Official Preparations

Oleum Amygdalæ Amaræ (*Oil of Bitter Almond*).—A volatile oil obtained by distillation from the bitter almond and other seeds containing amygdalin, yielding, when assayed, not less than 85 per cent. of *benzaldehyde,* and not less than 2 per cent. nor more than 4 per cent. of *hydrocyanic acid.*

It is seen as a clear, colorless, or yellow, thin, and strongly refractive liquid, having a peculiar aromatic odor and a bitter, burning taste. It is soluble in 300 parts of water, freely soluble in alcohol and ether. When fresh, it is neutral in reaction, but, when long kept, it acquires an acid reaction through the formation of benzoic acid.

Dose.—0.015 to 0.03 Cc.; $\frac{1}{4}$ to $\frac{1}{2}$ minim.

Aqua Amygdalæ Amaræ (*Bitter Almond Water*).—Prepared by dissolving 1 Cc. of Oil of Bitter Almond in enough Distilled Water to make 1000 Cc.

Bitter almond water is used as an agreeable vehicle.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Spiritus Amygdalæ Amaræ (*Spirit of Bitter Almond*).—Made by dissolving 1 Cc. of Oil of Bitter Almond in 80 Cc. of Alcohol and adding enough distilled water to make 100 Cc. It is used as an antispasmodic and also as a flavoring agent.

Dose.—0.2 to 0.6 Cc.; 3 to 10 minims.

Syrupus Amygdalæ (*Syrup of Almond*).—Made by mixing 1 Cc. of Spirit of Bitter Almond and 10 Cc. of Orange Flower Water with a sufficient quantity of Syrup to make 100 Cc.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

AMYGDALA DULCIS—Sweet Almond

Family, Rosaceæ; variety, Dulcis.

The ripe seed of *Prunus amygdalus,* a small tree indigenous to Asia, Persia, Marmosa, and also extensively and successfully cultivated in southern Europe and the Mediterranean basin. The seeds closely resemble bitter almond, but are usually broader, with lighter

seed coats, have a bland, sweetish taste, and give no odor of hydrocyanic acid when triturated with water. The seeds contain a large quantity of bland and *fixed oils* and *mucilage*.

Action and Uses.—The preparations of sweet almond are demulcents and agreeable vehicles. The fixed oil, known as the expressed oil of almond, is an *emollient* and mild *laxative*.

Official Preparations

Emulsum Amygdalæ (*Emulsion of Almond*). *Synonym*, Milk of Almond.—A white, milky emulsion made by blanching 6 Gm. of Sweet Almond, rubbing well with 1 Gm. of Powdered Acacia and 3 Gm. of Sugar, and then thoroughly triturating with 90 Cc. of Water gradually added, straining, and adding enough Water to make 100 Cc. The emulsion should be freshly prepared when required.

Used as a demulcent and agreeable vehicle.

Dose.—4 to 60 Cc.; 1 f℥ to 2 f ℥.

Oleum Amygdalæ Expressum (*Expressed Oil of Almond*). *Synonym*, Sweet Oil.—A fixed oil expressed from bitter or sweet almonds. It is a clear, pale, straw-colored or colorless oily liquid, almost inodorous, and having a mild, nut-like taste. Expressed oil of almond is used as an *emollient*, as a *mild laxative*, and in the preparation of Chloroform Liniment, Emulsion of Oil of Turpentine, Ointment of Rose Water, and Veratrine Ointment.

Dose.—4 to 30 Cc.; 1 f℥ to 1 f ℥.

AMYLIS NITRIS—Amyl Nitrite

Amyl nitrite is a liquid containing about 80 per cent. of Amyl Nitrite ($C_5H_{11}NO_2$ = 116.24). It should be kept in sealed glass bulbs or in dark amber-colored, glass-stoppered vials in a cool, dark place. It is a clear, yellowish, highly volatile, and inflammable liquid, having a peculiar, ethereal, fruity odor and a pungent taste, sparingly *soluble* in water, but freely miscible with alcohol and ether. It is made by acting upon amylic alcohol with nitric acid.

Action and Uses.—When inhaled, amyl nitrite acts with great rapidity, and, like other nitrites, lowers arterial tension, dilates the bloodvessels by central and peripheral action, and quickens the heart by reason of its depressing effect upon the pneumogastric nerves and by dilating of the arterioles. It depresses the motor side of the cord, and thereby acts as an antispasmodic; lowers temperature by increasing heat radiation; gives rise to vertigo and a feeling of cerebral fulness and headache, accompanied by marked flushing and cyanosis of the face. The blood becomes chocolate color by the conversion of its oxyhemoglobin into methemoglobin. After its use, the urine is usually increased in volume, and not infrequently contains sugar.

Amyl nitrite is *used* by inhalation for the relief of *angina pectoris*, to ward off oncoming *epileptic seizures*, and by inhalation, and also hypodermically, to relax spasm in cases of *poisoning by strychnine*.

A convenient method for *dispensing* is in small, fragile glass bulbs, each containing from 3 to 5 minims.

Dose.—0.2 to 0.6 Cc.; 3 to 10 minims.

AMYLUM—Corn Starch

A fine, white, inodorous powder, insoluble in water and alcohol, forming a whitish jelly when boiled with water, which when cooled gives a deep blue color with iodine.

Action and Uses.—In its dry state, corn starch is used as a dusting powder to absorb moisture and allay irritation of *heat rash*, *chafing*, *intertrigo*, and other moist inflammatory diseases of the skin. Made into a jelly by boiling it in water, it is used locally as a protecting and soothing agent for *inflamed mucous membranes*, and as an *antidote to iodine*.

Incompatibilities.—In solution, mineral acids, diastase, and heat convert starch into dextrin; iodine changes it into iodized starch; alkali hydroxides, mineral acids, tannic acid, alcohol, solution of lead subacetate, and lime water precipitate it.

Official Preparation

Glyceritum Amyli (*Glycerite of Starch*).—This gelatinized preparation, made by heating Starch in a mixture of Glycerin and Water, is *used* externally as a soothing application, and is also a good excipient for making pill masses.

ANISUM—Anise

Synonym, Anise Seed. *Family*, Umbelliferæ.

Anise is the dried, ripe fruit of *Pimpinella anisum*, collected mostly from Russia and the Mediterranean basin. It consists of two ovate carpels about $\frac{1}{5}$ inch (5 mm.) long, and is of a grayish or greenish-gray color. Each carpel has five ribs, between which there is a bristly hair, running from its base to its apex. The drug owes its properties to an aromatic, volatile oil, which has an agreeable odor and aromatic, sweet taste. Adulteration or admixture of the fruit with conium may be detected by pouring over a suspected specimen a solution of potassium hydroxide, which develops in conium a mouse-like odor.

Action and Uses.—The drug is looked upon as a mild, circulatory stimulant, a *carminative*, and as an *expectorant*, but is probably most frequently employed as a *flavoring agent*.

Dose.—0.3 to 0.6 Gm.; 5 to 10 grains.

Official Preparations

Oleum Anisi (*Oil of Anise*).—A colorless or pale yellow, volatile, aromatic oil distilled from anise or the fruit of star anise. It contains a camphoraceous substance, *anethol*, which congeals at 15° C. (59° F.). The oil enters into the formula of Camphorated Tincture of Opium, Troches of Glycyrrhiza and Opium, and also of the Anise Water, and Spirit of Anise.

Dose.—0.12 to 0.3 Cc.; 2 to 5 minims.

Aqua Anisi (*Anise Water*).—Made by triturating 2 Cc. of Oil of Anise with 15 Gm. of purified talc and then with 1000 Cc. of Water gradually added, and lastly filtering until clear.

Used as a vehicle.

Dose.—4 to 16 Cc.; 1 to 4 f℥.

Spiritus Anisi (*Spirit of Anise*).—Made by dissolving 10 Cc. of Oil of Anise in 90 Cc. of alcohol. *Used* as a carminative and flavoring agent.

Dose.—1 to 4 Cc.; 15 to 60 minims.

ANTHEMIS—Anthemis

Synonyms, Chamomile, English Chamomile, Roman Chamomile. *Family*, Compositæ.

The dried flower heads of *Anthemis nobilis* collected from cultivated plants. The flower heads are white, or cream colored, about $\frac{2}{3}$ to $\frac{3}{4}$ inch broad, subglobular, consisting of an imbricated involucre, and numerous white, strap-shaped, three-toothed ray florets, and a few tubular disk florets inserted upon a conical solid receptacle; odor, agreeable; taste, strongly aromatic and bitter. The flowers are cultivated in Europe and other temperate zones. They contain a volatile oil and anthemic acid.

Action and Uses.—This rather unimportant drug acts as a mild stomachic, diuretic, diaphoretic, and antispasmodic. Infusion or tea made from it is one of the popular domestic remedies which, while not capable of great good, is probably harmless. The infusion is used to *bring out the eruption of measles* and other exanthematous diseases, in the treatment of *colds*, to relieve painful *menstrual cramps*, and other similar conditions in which hot teas of any kind would probably be of equal value. The flowers are also occasionally used for making poultices. There are no official preparations of chamomile, nor does it enter into the composition of any official compound.

Dose.—2 to 4 Gm.; 30 to 60 grains.

ANTIMONII ET POTASSII TARTRAS—Antimony and Potassium Tartrate

Synonym, Tartar Emetic. *Formula*, $2K(SbO)C_4H_4O_6 + H_2O$ = 659.80.

Antimony and potassium tartrate is a white, granular powder, or colorless, transparent crystals, becoming opaque and white upon exposure to the air, free from odor, and having a sweet, afterward disagreeable, metallic taste. It is *soluble* in 15.5 parts of water, 3 parts of boiling water, and insoluble in alcohol.

Action and Uses.—Locally, antimony and potassium tartrate is an irritant; its continuous application to the skin causes a pustular eruption, which is followed by sloughing. Internally it is an emetic, expectorant, and a depressant to the circulation, respiration, and nervous system. Formerly it was extensively employed as an *emetic*, as a circulatory sedative, and antiphlogistic in the treatment of acute inflammations, such as *bronchitis*, *cystitis*, *orchitis*, *tonsillitis*, as a sedative *expectorant*, and also for the purpose of producing muscular relaxation. At one time a most popular remedy, it is now rarely used except in combination with other drugs for aborting *colds* and other mild local inflammations. It enters into the composition of Compound Syrup of Squill, and Wine of Antimony, the wine entering into the composition of Compound Mixture of Glycyrrhiza.

Poisoning and Treatment.—In toxic quantities, antimony and potassium tartrate produce violent vomiting, severe purging, rice-water stools, cramps in the calves of the legs, epigastric pains, profound circulatory and respiratory depression, and great prostration. It also produces, especially when the poisoning has been particularly severe, fatty degeneration of the tissues. The chemical *antidote* is tannic acid, which should be administered in full quantities. The stomach should be washed out; milk, oils, and mucilage given to protect the inflamed mucous membrane; opium to relieve pain; and stimulants, such as atropine, ether, and strychnine administered hypodermically to overcome depression. The patient should be kept in a recumbent position, covered with blankets, and warm-water bags or bottles applied to the body.

Incompatibilities.—The addition of alcohol to a concentrated aqueous solution of the salt causes its precipitation in the form of a crystalline powder; aqueous solutions containing it are decomposed and precipitated by the addition of mineral acids, the salts of most metals and earths, tannic acid, and alkali carbonates.

Dose.—As emetic, 0.03 to 0.06 Gm., $\frac{1}{2}$ to 1 grain; as circulatory sedative and expectorant, 0.004 to 0.008 Gm., $\frac{1}{16}$ to $\frac{1}{8}$ grain.

Official Preparations

Syrupus Scillæ Compositus (*Compound Syrup of Squill*). *Synonym*, Coxe's Hive Syrup.

Composition.—Fluidextract of squill, 8 Cc.; Fluidextract of Senega, 8 Cc.; Antimony and Potassium Tartrate, 0.2 Gm.; Purified Talc, 2 Gm.; Sugar, 75 Gm.; Water, a sufficient quantity to make 100 Cc.

Each fluidounce contains about 1 grain of Antimony and Potassium Tartrate. *Used* as an expectorant.

Dose.—0.6 to 4 Cc.; 10 to 60 minims.

Vinum Antimonii (*Wine of Antimony*).

Composition.—Antimony and Potassium Tartrate; Boiling Distilled Water; Alcohol; White Wine.

Made by dissolving 0.4 Gm. of Antimony and Potassium Tartrate in 6.5 Cc. of boiling Water, and, when cool, adding to a mixture of Alcohol 17.5 Cc. and White Wine 75 Cc., filtering, and adding enough White Wine to make 100 Cc. Each fluidounce contains about 2 grains of antimony and potassium tartrate. The wine enters into the composition of Compound Mixture of Glycyrrhiza in such a quantity as to be equal to about $\frac{1}{8}$ grain of Antimony and Potassium Tartrate in each fluidounce of the mixture.

Used as an *expectorant, circulatory depressant,* and *diaphoretic.*

Dose.—0.3 to 2 Cc.; 5 to 30 minims.

ANTIPYRINA—**Antipyrine, Phenyldimethylpyrazolon**

Synonym, Phenazone. *Formula*, $C_{11}H_{12}N_2O$ = 186.75.

A colorless, almost odorless, crystalline powder or cubical crystals, having a slightly bitter taste, leaving a sensation of slight anesthesia of the tongue and mucous membrane of the mouth. It is obtained by the condensation of phenylhydrazine with aceto-acetic ether, and methylization of the product. Antipyrine is freely *soluble* in water, alcohol, glycerin, chloroform, and in 30 parts of ether. In aqueous solution it is neutral to litmus paper, but unites directly with acids to form salts. Tannic acid added to an aqueous solution of antipyrine produces a white precipitate; tincture of ferric chloride gives a deep red to light yellow color upon the addition of sulphuric acid; acidulated solution of any nitrate, or of nitric acid, develops a green color. Its adulteration with acetanilide or phenacetine may be detected by adding to a 1 per cent. aqueous solution an equal volume of nitric acid, which, if either are present, will give a yellowish color, changing to crimson upon warming.

Action and Uses.—In medicinal doses, antipyrine is a sedative to the nervous system, and is employed to relieve various forms of nerve pains, such as *neuralgic headache, sciatica,* and also in the treatment

of certain convulsive diseases, such as *epilepsy* and *whooping cough.* It increases heat radiation and lessens heat production, and is therefore employed in reducing heightened temperature in *fevers* of a sthenic type. While we have no good experimental evidence to prove that it is a depressant to the heart, we know that circulatory depression and collapse have followed the use of medicinal doses, and, therefore, we studiously avoid its use in all cases of asthenia, circulatory depression, and in diseases that end by crisis. The blood is not changed by the moderate use of medicinal doses, but large doses or prolonged use may lead to serious corpuscular change. The remedy increases the susceptibility of persons to contract cold.

Poisonous Effect.—Great prostration, cyanosis, cold sweats, circulatory depression, respiratory depression.

Treatment of Poisoning.—Administer circulatory stimulants, such as aromatic spirit of ammonia, strychnine, atropine; surround the patient with warm blankets, hot-water bags, or hot-water bottles, and, if cyanosis is marked or does not clear up, oxygen should be administered by inhalation.

Incompatibilities.—Antipyrine develops a green color with spirit of nitrous ether; liquefies when triturated with hydrated chloral, salicylates, ethyl carbamate, and resorcinol. It is precipitated by tannic acid, and is said to produce a poisonous compound when triturated with mild mercurous chloride.

Dose.—0.13 to 1 Gm.; 2 to 15 grains.

APOCYNUM—Apocynum

Synonym, Canadian Hemp. *Family,* Apocynaceæ.

The dried rhizome of *Apocynum cannabinum,* a perennial herb found growing wild in grassy fields and along the borders of woods in the United States and Canada. The purplish stem, which is tough and fibrous, and grows to a height of about 3 feet (1 M.), abounds in an adhesive milky juice.

The dried rhizome, as seen in the shops, is in segments of varying lengths, $\frac{1}{8}$ to $\frac{1}{3}$ inch (3 to 8 mm.) thick, cylindrical, lightly longitudinally wrinkled, and more or less fissured transversely. Externally it is orange-brown or gray brown in color; the woody portion is yellow, having several rings finely radiate and very coarsely porous. It is almost inodorous, and has a starchy taste, afterward becoming bitter and somewhat acrid.

The rhizome contains apocynin, a resin-like substance, *apocynein,* a glucoside, resins, and tannin.

Action and Uses.—In medicinal doses apocynum is a cardiac stimulant and diuretic. In overdoses it is a gastro-intestinal irritant. It is *used* in the treatment of *cardiac* or *renal dropsy.*

Official Preparation

Fluidextractum Apocyni (*Fluidextract of Apocynum*).—Made with a menstruum of 5 parts of Alcohol, 3 parts of Water, and 1 part of Glycerin.

Dose.—0.3 to 0.6 Cc.; 5 to 10 minims.

APOMORPHINÆ HYDROCHLORIDUM—Apomorphine Hydrochloride

Formula, $C_{17}H_{17}NO_2.HCl = 301.34$.

The hydrochloride of an artificial alkaloid prepared from morphine ($C_{17}H_{19}NO_3$), by the abstraction of 1 molecule of water (H_2O). The usual method of manufacture is by heating a mixture of morphine and hydrochloric acid contained in a sealed bottle to a temperature of from 140° C. to 150° C. (284° F. to 302° F.), for three hours. Apomorphine thus prepared is abstracted and crystallized by treating the above solution, after cooling, with a supersaturated solution of bicarbonate of soda, chloroform, and diluted hydrochloric acid.

Apomorphine is seen in minute, grayish-white, monoclinic prisms, glistening, and acquiring a greenish tint upon exposure to the air. It is odorless, has a slightly bitter taste, is neutral in reaction, and *soluble* in 39.5 parts of water, 38.2 parts of alcohol, and sparingly soluble in ether or chloroform.

Action and Uses.—Although derived from morphine, apomorphine is not a narcotic. It is feebly sedative to the nervous system, feebly sedative to the brain, has but little effect upon the respiration, and quickens the pulse. Its most remarkable action is its stimulating effect upon the vomiting centre located in the medulla, thereby producing prompt emesis when administered either by the mouth or hypodermically. The drug is usually employed as an *emetic* to produce vomiting in cases of poisoning, or in any case in which it is desired to empty the stomach promptly, as an expectorant, and also as a mild nervous sedative to quiet the excitement of *delirium tremens*. The drug is usually *administered* hypodermically, care being taken to use only the crystalline variety which has not become green in color.

Dose.—As emetic, 0.006 to 0.013 Gm., $\frac{1}{10}$ to $\frac{1}{5}$ grain; as expectorant, 0.002 Gm., $\frac{1}{30}$ grain.

AQUA HYDROGENII DIOXIDI—Solution of Hydrogen Dioxide

Synonym, Peroxide of Hydrogen.

Solution of hydrogen dioxide is a slightly acid, aqueous liquid containing about 3 per cent., by weight, of absolute hydrogen dioxide (H_2O_2), corresponding to about 10 volumes of available oxygen.

The solution is transparent, colorless, and odorless, has a distinct

acidulous taste, and when taken into the mouth produces a peculiar tingling sensation and a soapy froth. It is freely miscible with water and glycerin, but is decomposed by alcohol.

Upon long keeping, the hydrogen dioxide in solution gradually decomposes into water and oxygen. If, upon removing, a tightly fitted stopper from a bottle containing the solution, if more than a slight pressure within the bottle should be observed, it is evidence that considerable decomposition has occurred. Decomposition of hydrogen dioxide is retarded by cold and acids, and hastened by heat, shaking, and alkalies.

If desired, the solution may be concentrated by placing it in a perfectly clean, smooth, porcelain evaporating dish and carefully heating it over a water-bath at a temperature not exceeding 60° C. (140° F.); at a higher temperature the solution may suddenly decompose. Pus, blood, albumin, pseudomembranes, and many organic and inorganic substances decompose hydrogen dioxide and are at the same time decomposed by it. The value of solution of hydrogen dioxide depends upon its instability; the readiness with which it yields nascent oxygen. This propensity of hydrogen dioxide properly classes it as a powerful oxidizer, but it is peculiar in that it does not oxidize certain substances, such as phosphorus, which have a strange affinity for oxygen.

Hydrogen dioxide is also peculiar in that it reduces certain salts, such as manganese dioxide, silver oxide, and potassium oxide. Certain substances, such as dust, powdered charcoal, platinum, gold, the enzymes, have a catalytic action upon hydrogen dioxide, decomposing it into oxygen and water, but are not themselves chemically changed.

Solution of Hydrogen Dioxide is made by decomposing an aqueous solution of barium dioxide by an aqueous solution of phosphoric acid. The solution is slightly acidified for the purposes of preserving it. It should be kept in a cool place in bottles loosely stoppered with pledgets of cotton.

Action and Uses.—Solution of Hydrogen Peroxide has little or no effect upon the normal tissues, but when applied to pseudomembranes, or ulcerated or bleeding surfaces, it rapidly decomposes, forming a frothy foam, and disorganizes the pseudomembranes and pus or blood.

It is *used* to cleanse, disinfect, and deodorize foul *ulcers;* for the purpose of removing the pseudomembrane of *diphtheria, scarlet fever,* and *follicular tonsillitis,* and also to a limited extent, as a styptic to control *passive hemorrhages.* It may be *applied* either diluted with water or undiluted; either as a spray or by means of a swab. The addition of sodium bicarbonate to solution of hydrogen dioxide neutralizes it and renders it less irritating, less likely to injure the teeth, and also hastens its decomposition. The alkali should be added at the time of using, as after a time it renders the solution inert; furthermore, it generates gases which will either displace the stopper or, if confined in a bottle, will cause it to explode.

Solution of hydrogen dioxide, by reason of its oxidizing property, is employed as an *antidote to hydrocyanic acid,* which it converts into

oxamide. In the arts and as a household article it is used as a bleaching agent.

Incompatibilities.—Solution of Hydrogen Dioxide is decomposed by alcoholic liquids, alkalies, permanganates, iodides, chlorides, bromides, phenol, ferric compounds, chlorine compounds, and cyanides; it oxidizes sulphur and arsenic; it reduces silver oxide, and manganese dioxide.

Dose.—4 to 8 Cc.; 1 to 2 f3.

ARGENTUM—Silver

Three salts of this metal are official—the cyanide, nitrate, and oxide. The *cyanide* is used only in the preparation of diluted hydrocyanic acid, and is not employed either locally or internally. The *nitrate* is official in forms of silver nitrate, in crystals; moulded silver nitrate, in pencils; and mitigated silver nitrate, also in pencils. The *oxide* is a dark-brown, insoluble powder.

Official Preparations

Argenti Nitras (*Silver Nitrate*). *Formula*, $AgNO_3$.—Transparent, tabular crystals, becoming dark upon exposure to light and in the presence of organic matter. It has a bitter, caustic, and strong metallic taste, is *soluble* in 0.54 parts of water. On account of being changed to a dark color when exposed to light, the crystals and all solutions of it should be kept in dark blue bottles.

Action and Uses.—Locally, silver nitrate is an antiseptic, astringent, irritant, and caustic, according to the degree of its concentration. It coagulates the albumin of the tissue when brought in contact with it, and also produces black stains upon surfaces exposed to the light. As an antiseptic, it may be used in aqueous solution of from 0.5 to 2 per cent.; as an astringent, up to 10 per cent.; and as a caustic, in the form of sticks or pencils. As it promptly coagulates the albumin of the tissue when brought in contact with it, silver nitrate does not penetrate deeply, and is, therefore, a caustic of limited power. Solutions are used as an antiseptic astringent in treating infections and *acute inflammation* of the eyes, ears, pharynx, tonsils, vagina, and urethra, and as a cauterant and astringent in the treatment of *ulcers*. In pills it is used internally in *gastric catarrh*, *gastric ulcer*, and *chronic diarrhœa*.

Acute Poisoning and Antidote.—Toxic quantities of the drug give rise to acute gastro-enteritis. There is burning in the œsophagus, violent epigastric and abdominal pain, and vomiting of white curds, which upon exposure become dark. The *antidote* is any non-irritating, soluble chloride, common table salt being usually employed. The stomach should be washed out with warm water containing salt, opium given to relieve pain, eggs, milk, or bland oils to protect the mucous membrane of the digestive tract, and stimulants in case of depression.

Chronic Poisoning.—Silver nitrate when taken internally or used locally for too long a time, decomposes, oxidizes, and stains the skin and those mucous membranes which are exposed to light, producing a permanent dark or slate-colored discoloration of the tissues, a condition known as *argyria*.

Incompatibilities.—Opium and extract of hyoscyamus are the only drugs prescribed in combination with silver nitrate, it being incompatible with almost everything else. Chlorides and hydrochloric acid change it into insoluble silver chloride; organic substances slowly oxidize it. Aqueous solutions should be made in distilled water only, as the chlorides and organic matter in ordinary water precipitate it. Solutions in spirit of nitrous ether are preferred by some physicians for local application, but the nitrate is slowly reduced by the alcohol of the spirit, and, therefore, such solutions should not be long kept.

Dose.—0.008 to 0.012 Gm.; $\frac{1}{6}$ to $\frac{1}{2}$ grain.

Argenti Nitras Fusus (*Moulded Silver Nitrate*). *Synonym*, Lunar Caustic.—Moulded silver nitrate is made by mixing in a porcelain dish 100 Gm. of Silver Nitrate crystals with 4 Gm. of Hydrochloric Acid, melting at as low a temperature as possible, pouring into suitable silver or gold-lined iron moulds and cooling. Ordinarily, the sticks, cones, or pencils are about 1 inch in length, about $\frac{1}{8}$ of an inch in diameter, cone-shaped at one end. The pencils are sometimes coated by being dipped into melted paraffin, this coating should be scraped off before using the cones.

Uses.—These cones or pencils are used for destroying unhealthy granulations in *ulcers*, for removing venereal or other *warts*, or in any case where the escharotic action of silver nitrate is desired.

Argenti Nitras Mitigatus (*Mitigated Silver Nitrate*). *Synonyms*, Diluted Silver Nitrate; Mitigated Caustic.

Nitrate of silver, mitigated by potassium nitrate and moulded into cones or pencils, is made by mixing in a porcelain dish 30 Gm. of silver Nitrate, 60 Gm. Potassium Nitrate, melting at the lowest temperature possible, and pouring into suitable silver or gold-lined iron moulds. The cones are frequently coated by being dipped into melted paraffin.

Uses.—These pencils, cones, or sticks of mitigated silver nitrate are suitable for use when a milder caustic action is desired, than could be had from using the moulded silver nitrate.

Argenti Oxidum (*Silver Oxide*). *Formula*, Ag_2O.—An olive-brown or black powder, only *sparingly soluble* in water, made by precipitating an aqueous solution of silver nitrate by the addition of solution of potassium hydroxide or lime water. It should not be triturated with readily combustible substances nor brought in contact with ammonia. Creosote, tannic acid, amorphous phosphorus, precipitated sulphur, and several other substances are rendered spontaneously combustible when mixed with the oxide. With ammonia it forms a violently explosive compound.

Action and Uses.—This salt is a milder antiseptic and astringent than silver nitrate. *Internally,* in pills or capsules, it is employed in *chronic gastric catarrh* and in *diarrhœa.* In petrolatum, 5 to 10 grains to the ounce, it is applied *locally* as an antiseptic and astringent, and for the removal of *venereal warts.*

Argenti Cyanidum (*Silver Cyanide*). *Formula,* AgCN = 132.96.—Silver cyanide is seen as a white powder, without odor or taste, gradually turning brown upon exposure to light. It is insoluble in water or alcohol; evolves hydrogen and precipitates silver chloride upon the addition of diluted hydrochloric acid.

It is *used* in preparing diluted hydrocyanic acid.

ARNICA—Arnica

Synonym, Arnica Flowers. *Family,* Compositæ.

The dried flower heads of *Arnica montana,* a perennial plant, one or two feet high, indigenous to Europe, collected chiefly in Germany and Switzerland. A plant of the genus resembling Arnica montana growing in the mountainous region west of the Mississippi river in the United States furnishes much of the arnica found in the shops. The flower heads are subglobular, about 1 inch (25 mm.) long, of a yellow color, having a characteristic and agreeable odor, and a bitter taste. They contain a volatile oil, a bitter principle known as *arnicin,* resin, and coloring matter.

Action and Uses.—The drug is a local irritant. The tincture, the only official preparation, is popular in domestic medicine as a local application for *bruises, sprains,* and in *rheumatism.* In these conditions it acts purely as a counterirritant. It is also applied as an antiseptic and hemostatic in slight abrasions, its value being due largely to the alcohol in the tincture. Occasionally, after local application, there is considerable swelling, redness, and sometimes pustulation of the skin of persons peculiarly susceptible to the effects of the drug. It is occasionally administered by mouth as a stimulant to the gastric mucosa in *atonic dyspepsia.*

Official Preparation

Tinctura Arnicæ (*Tincture of Arnica*).—Made by percolating 20 Gm. of Powdered Arnica with enough Diluted Alcohol to make 100 Cc. of the tincture.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

ARSENIC—Arsenic

Symbol, As.

The metal arsenic is sometimes found in the pure native state, but more frequently in combination with sulphur as a sulphide, or with

iron, cobalt, nickel, zinc, and other metals as an arsenide. It may be obtained in a state of purity by heating arsenic trioxide with charcoal and condensing the vapor. The pure metal is steel gray, but upon exposure to the atmosphere its surface oxidizes, loses its metallic luster, and becomes darker; it is odorless and tasteless. When heated out of the access of air it volatilizes unchanged without melting at 180° C. (356° F.). If heated to a high temperature in air it burns with a bluish-white light, forming arsenic trioxide. The vapor from arsenic has the odor of garlic. Although the metal is insoluble in water, when digested with that liquid it is in part oxidized to arsenic trioxide, which, in turn, is changed into arsenous acid and is found as such in solution.

The metal forms two combinations with oxygen—arsenic trioxide (As_2O_3), which is official, and arsenic pentoxide (As_2O_5), which is not official. The *metal* is not used as a medicine, but its various official solid and liquid compounds are extensively employed as such.

Official Preparations

Arseni Iodidum (*Arsenous Iodide*). *Formula*, AsI_3 = 452.10.—An orange-red, inodorous, crystallized powder. It is *soluble* with partial decomposition in 12 parts of water and 28 parts of alcohol. It is made by carefully heating together metallic arsenic and iodine, or by mixing a solution of arsenic trioxide in hydrochloric acid with a concentrated aqueous solution of potassium iodide, collecting the precipitate and washing it with hydrochloric acid.

Action and Uses.—Arsenous iodide combines the tonic effect of arsenic trioxide with the alterative action of iodide. In toxic doses it is a violent irritant similar to arsenic trioxide. Its most frequent *uses* is in treating the *anemia* of *syphilis*, *lupus*, *psoriasis*, and *chronic eczema*.

Poisoning and Treatment.—The symptoms of poisoning and treatment are similar to those described under arsenic trioxide.

Dose.—0.0006 to 0.003 Gm.; $\frac{1}{100}$ to $\frac{1}{20}$ grain.

Liquor Arseni et Hydrargyri Iodidi (*Solution of Arsenous and Mercuric Iodides*). *Synonym*, Donovan's Solution.—Made by dissolving 1 Gm. of Arsenous Iodide, and 1 Gm. of Red Mercuric Iodide in 100 Cc. of Distilled Water.

Dose.—0.06 to 0.2 Cc.; 1 to 3 minims.

Arseni Trioxidum (*Arsenic Trioxide*). *Synonyms*, Arsenous Acid; White Arsenic. *Formula*, As_2O_3 = 196.44.—Arsenic trioxide, usually obtained by roasting arsenical ores in a current of air and condensing the vapor in a cooled chamber, is a heavy, odorless, tasteless solid, seen either as *a white opaque powder* as irregular, amorphous, semitransparent, colorless, glassy masses, or as irregular, crystalline, opaque, white masses resembling porcelain. Occasionally a mass may be seen containing both the crystalline and the amorphous varieties. The amorphous, glassy variety, by a rearrangement of the molecules, upon

exposure to moist atmosphere, slowly changes into the opaque crystalline variety.

The several varieties of arsenic trioxide are *dissolved slowly* and with difficulty, the degree of solubility varying according to conditions and time; the amorphous, or glassy oxide is *soluble* in about 30 parts of water, and the porcelain-like or crystalline powder in about 100 parts of water at 25° C. (77° F.); both are slowly, but completely, soluble in about 15 parts of boiling water. The chemical is sparingly soluble in alcohol, but dissolves in 5 parts of glycerin, and is freely soluble in hydrochloric acid and in solutions of the alkali hydroxides and carbonates. Solution in water changes arsenic trioxide to arsenous acid. When slowly heated in a test-tube, arsenic trioxide sublimes and yields brilliant, transparent, octohedral crystals. If mixed with charcoal in an ignition tube and strongly heated, the oxide is deoxidized, and metallic arsenic is deposited in the cooler portions of the tube as a mirror having a metallic luster.

Action and Uses.—Arsenic trioxide is an irritant to all the organs and tissues with which it comes in contact, either by direct application or through its absorption. In very great dilution this irritation may amount to mild stimulation only, but, in concentrated form, the chemical is a destructive, corrosive irritant. Applied in the dry state it has but little effect upon the normal unbroken skin, but if applied as a paste, after a time it destroys the skin and underlying tissues.

The chemical is looked upon as a valuable constructive tonic, and a stimulant to the blood-making organs, to the trophic nervous apparatus, and to the respiratory centres. Mixed with starch or acacia and formed into a paste with water, it may be employed *locally* to effect the removal of *warts*, *condylomata*, and small *epithcliomata*. Such pastes are painful and often more destructive than desirable.

Internally, arsenic trioxide is used in the treatment of *anæmia*, *chronic malaria*, *chronic inflammation of the stomach*, *bowels*, *bronchi*, of *chorea*, *chronic dry diseases of the skin*, *gout*, *chronic rheumatism*, and a variety of diseases associated with malnutrition.

Administration.—Arsenic and all its preparations, being local irritants, should be administered in a state of dilution or be quickly followed by a full glass of water, and preferably after meals. Many persons are unusually susceptible to the influences of arsenical compounds, and it is considered advisable to begin their administration most cautiously. The quantities, if desired, may be gradually increased to the ordinary doses, being carefully watched for the signs and symptoms which indicate that the limit of endurance has been reached, when, if noted, the drug should be reduced in quantity or temporarily discontinued. That the physiological limit has been reached may be known by the development of one or several of the following signs and symptoms: Slight nausea; relaxation of the bowels; intestinal pains; moderate œdema under the eyes; a burning sensation of the skin; the development of herpes zoster; coryza.

Chronic Poisoning.—In cases of chronic arsenical poisoning, the above signs and symptoms of the full physiological effects of the drug are present in an exaggerated form, and in addition there may be pigmentation of the skin, patches of anesthesia, local paralysis, multiple neuritis, and falling of the hair.

Acute Poisoning.—Violent gastro-enteritis, as manifested by violent epigastric and abdominal pain, severe vomiting, severe purging, rice-water stools often containing blood, a sensation of dryness and constriction of the pharynx, and great thirst. In addition there are marked symptoms of genito-urinary irritation, such as pain in the loins, frequent micturition of small quantities of concentrated albuminous urine. There may be pain in the extremities, profound exhaustion, circulatory and respiratory exhaustion. If death does not rapidly ensue from the poison, the violence of the symptoms may abate, and then after a few days return with renewed violence. The prognosis should, therefore, be most guarded in all cases of severe arsenical poisoning.

Treatment of Acute Poisoning.—The stomach should be washed out. The chemical antidote of ferric hydroxide with magnesium oxide should be administered to render the arsenic insoluble; external heat should be applied and stimulants administered, and, if necessary, opiates given to relieve pain. The arsenical antidote may be made according to the U. S. P. process as follows:

Mix 40 Cc. (f ℥x) of solution of Ferric Sulphate with 125 Cc. (f ℥iv) of Water. Rub 10 Gm. (℥iiss) of Magnesium Oxide with water to make a smooth and thin mixture, transfer this to a bottle capable of holding about 1000 Cc. (Oij), and add enough water to make about 750 Cc. (Oiss). Shake well and add the magnesium oxide mixture to the diluted solution of ferric sulphate, and shake them well together until a uniform, smooth mixture results. The mixture is to be administered freely without washing or straining.

For the rapid preparation of this antidote, the diluted solution of ferric sulphate and the mixture of magnesium oxide with water should always be kept on hand in separate bottles ready for immediate use. It is a very good plan to first wash out the stomach with milk or water and then with a part of the antidote, and finally leave at least 125 Cc. (f ℥iv) of the antidote in the stomach.

Freshly precipitated ferric hydroxide, made by adding ammonia water to a diluted solution of ferric sulphate, may be employed if the first-named antidote cannot be readily procured. Aside from the fact that freshly precipitated ferric hydroxide is somewhat less valuable than ferric hydroxide with magnesium oxide, a longer time is required for making it, as the collected precipitate must be freed from ammonia water by washing before administering it. If at hand, dyalized iron added to water may be employed. Freshly precipitated ferric hydroxide may be prepared from any ferric solution, but the solution of ferric sulphate, being stronger in the iron salt, is to be preferred.

There are a number of arsenical salts and solutions official, and all

that has been said above as to action, uses, poisonous action of, and treatment of poisoning by, applies equally to all arsenical compounds, salts, and preparations. All the official arsenical solutions contain about 1 per cent. of the arsenical compound, and with the exception of solution of arsenous and mercuric iodides, which, in addition to 1 per cent. of arsenous iodide contains 1 per cent. of red mercuric iodide, are the same dose. The oxide is used in making Solution of Potassium Arsenite.

Dose.—0.0006 to 0.003 Gm.; $\frac{1}{100}$ to $\frac{1}{20}$ grain.

Liquor Acidi Arsenosi (*Solution of Arsenous Acid*).—Made by dissolving 1 Gm. of Arsenic Trioxide by the aid of heat in a mixture of 5 Gm. of Diluted Hydrochloric Acid and enough Distilled Water to make 100 Gm. of the solution.

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

Liquor Potassii Arsenitis (*Solution of Potassium Arsenite*). *Synonym*, Fowler's Solution.—A transparent, or slightly opalescent liquid, having a faintly pink color, and the faint, agreeable odor of compound tincture of lavender, containing potassium arsenite corresponding to 1 per cent. of Arsenic Trioxide. It is made by boiling Arsenic Trioxide and Potassium Bicarbonate in Distilled Water until they have been dissolved, adding a sufficient quantity of Water and then Compound Tincture of Lavender.

Uses.—Its action and uses resemble those stated under Arsenic.

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

Sodii Arsenas (*Sodium Arsenate*). *Formula* $Na_2HAsO_4 + 7H_2O$.—Sodium Arsenate is made by subjecting an aqueous mixture of Arsenic Trioxide, Sodium Nitrate, and Sodium Carbonate contained in a clay crucible to red heat, dissolving the resulting mass in hot water, filtering, collecting, and drying the crystals which form after the solution has cooled. The salt is colorless, transparent, in monoclinic prisms, which effloresce in dry air, and are somewhat deliquescent in moist air. It is odorless, has a mild alkaline taste, but being slightly toxic should be tasted with caution; is *soluble* in 1.2 parts of water, freely soluble in boiling water, and very sparingly soluble in alcohol.

Uses.—Its action and uses resemble those stated under Arsenic. It is employed in making Exsiccated Sodium Arsenate.

Dose.—0.012 to 0.006 Gm.; $\frac{1}{50}$ to $\frac{1}{10}$ grain.

Sodii Arsenas Exsiccatus (*Exsiccated Sodium Arsenate*). *Formula*, Na_2HAsO_4.—This amorphous, white powder is permanent in air, odorless, *soluble* in 3 parts of cold water, freely soluble in hot water, and sparingly soluble in alcohol. It is made by subjecting effloresced crystals of sodium arsenate to 150° C. (302° F.) dry heat until all water of crystallization has been driven off. As the uneffloresced salt contains 40 per cent., by weight, of water of crystallization, it will be noted that this salt is nearly twice as strong.

Uses.—Its action and uses resemble those of sodium arsenate. It is used in making Solution of Sodium Arsenate.

Dose.—0.0006 to 0.003 Gm.; $\frac{1}{100}$ to $\frac{1}{20}$ grain.

Liquor Sodii Arsenatis (*Solution of Sodium Arsenate*). *Synonym*, Pearson's Solution.—An aqueous solution made by dissolving 1 Gm. of Exsiccated Sodium Arsenate in a sufficient quantity of Distilled Water to make 100 Gm. of solution.

Each minim represents approximately about $\frac{1}{100}$ grain of exsiccated sodium arsenate.

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

An Important Unofficial Salt of Arsenic

Paradiamidodioxyarsenobenzolum Hydrochloridum (*Paradiamidodioxyarsenobenzol Hydrochloride*). *Synonyms*, Salvarsan, "606." *Formula*, $HCl.NH_2.OH.C_6H_3.As{:}As.C_6H_3.OH.NH_2.HCl$. — This arsenical compound, also known as dioxydiamidoarsenobenzol hydrochlorate, and incorrectly as arsenobenzol, was brought to the attention of the medical profession by Ehrlich, of Germany. It is a fine yellow powder, containing about 35 per cent. of arsenic in a low state of oxidation, and is a powerful reducing agent for all oxidizers, including air. On account of its instability it is furnished in sealed glass tubes or ampoules, each containing 0.6 Gm. of the salt. The powder dissolves readily in water, furnishing a yellow, strongly *acid* solution. The gradual addition of solution of sodium hydroxide to an aqueous solution of salvarsan develops a precipitate which redissolves upon the further addition of solution of sodium hydroxide.

Action and Uses.—This compound of arsenic appears to have a very powerful affinity for, and destructive action upon, the spirochetes of syphilis, while at the same time being far less destructive or injurious to the tissues or organs of the human body than other arsenical compounds. The substance having a low organotrophic, and a high parasitotrophic, influence permits of its administration in much larger doses than other arsenicals. Pain, fever, nausea, and sweating are common after its administration, and in some cases syncope, and even death, has followed the injection of medicinal doses of the salt. During the year 1910 Ehrlich introduced the remedy for use by intravenous, intramuscular, or subcutaneous injection in the treatment of *syphilis*. While it is beyond doubt that in many instances the injection of a single dose has been followed by the rapid, almost miraculous, disappearance of the lesions of syphilis, its value as a permanent cure is as yet not fully established. The remedy is contraindicated in patients with severe cerebral disease, with advanced degenerative processes of the nervous system, arteriosclerosis, functional disturbances of the heart, angina pectoris, changes in the optic nerve, diseases of the retina, high-grade anemias, marked cachexia, exhaustion, and emaciation, and also in those having an idiosyncrasy to arsenic.

Administration.—Salvarsan does not act satisfactorily when administered by the mouth or the rectum, nor is there any general agreement as to whether the best results are obtainable by intravenous, intramuscular, or subcutaneous injections; each method has its advocates.

When given intravenously, the remedy should be injected in the form of a very *dilute*, feebly *alkaline* aqueous *solution;* when administered by intramuscular or subcutaneous injection, the remedy may be given either in *feebly alkaline* aqueous *solution*, or in a *neutral* aqueous *suspension.* Many methods of preparing the remedy for administration have been suggested; those of Wechselmann, Alt, Lesser, and Michaelis are given below.

Wechselmann's Method for preparing a *neutral suspension* of Salvarsan for subcutaneous or intramuscular injection:

Place the contents of an ampoule (0.6 Gm.) in a sterile mortar, add 1 to 2 Cc. of normal sodium hydroxide solution and triturate until a clear solution is formed. Glacial acetic acid is now added, drop by drop, until a fine yellow precipitate falls. The precipitate thus formed is collected in from 1 to 2 Cc. of sterile distilled water, and using litmus paper as an indicator, the liquid is exactly neutralized by the use of 1 per cent. acetic acid or decinormal sodium hydroxide solution. The liquid is now centrifuged, the sediment collected in 4 to 8 Cc. of physiological salt solution for injection into the muscles, or subcutaneous tissues.

Lesser's Method of preparing a *neutral solution* of Salvarsan for intramuscular on subcutaneous injection:

Place the contents of an ampoule (0.6 Gm.) in a glass cylinder of 100 Cc. capacity, immediately add 15 Cc. of hot distilled water, and shake vigorously until solution is complete. Add 2 Cc. of normal sodium hydroxide solution, and then gradually, drop by drop, more normal sodium hydroxide solution until the precipitate is redissolved. The *solution* thus prepared should be neutral. Add sterile distilled water to make 20 Cc.

This solution is usually employed by injecting 10 Cc. into each buttock.

Alt's Method for preparing a slightly *alkaline solution* for *intravenous*, or intramuscular injection:

Pour 10 Cc. of sterile distilled water into a sterile, narrow, graduated, glass-stoppered cylinder of the capacity of 100 Cc., and containing 30 medium-size glass pearls. Add the contents of an ampoule (0.6 Gm.), shake vigorously to obtain a *clear solution.* To each 0.1 Gm. of Salvarsan used, add 0.5 Cc. of normal sodium hydroxide solution, and shake again for about thirty seconds. In order to avoid over-alkalinization, a very minute quantity of the salt should be allowed to remain undissolved as the sodium hydroxide solution is added. This method furnishes a clear, wine-colored, *weakly alkaline solution*, which may be diluted to the desired extent with sterile distilled water. When intended for intramuscular injection, dilute with about 15 to 20 Cc. of sterile distilled water; when intended for intravenous injection, it should be diluted with 180 to 200 Cc. of sterile distilled water.

Michaelis' Method of preparing a neutral or feebly alkaline solution of Salvarsan for subcutaneous injection:

Triturate 0.6 Gm. of Salvarsan with 25 Cc. of hot boiled water until

it is dissolved, and then add 6 Cc. of normal sodium hydroxide solution, continuing the stirring until the resulting precipitate is completely redissolved. Three (3) drops of ½ per cent. solution of phenolphthalein are added and normal acetic acid dropped in until, with constant stirring, the reaction becomes neutral, *i. e.*, until the phenolphthalein is just decolored. Thus is produced the neutral emulsion, which has a yellow color. In order to absolutely avoid any acid reaction, normal sodium hydroxide solution is added, drop by drop, until very slight reddening of the phenolphthalein appears.

Doses of Salvarsan.—The average dose for a strong adult is about 0.6 Gm.; for children from 0.008 to 0.01 Gm. per Kg. of body weight; for nurslings, about 0.009 Gm. per Kg. of body weight.

The reinjection of an adult at an interval of from 10 to 70 days is not contraindicated.

ASAFŒTIDA—Asafetida

Family, Umbelliferæ.

A gum-resin obtained from the root of *Ferula fœtida*, a large perennial herb and probably other species of ferula, collected chiefly in Persia and west Afghanistan from plants, the roots of which have been incised and covered over with twigs and clay to protect them from the direct rays of the sun. The exudate of the root is first milky, but becomes firm and reddish in color in about five weeks, at which time it is collected. The gum-resin appears in the market in tears or in irregular masses made up of tears of variable size embedded in a yellowish-brown matrix; when fresh, the tears are tough, yellowish white, and translucent, or milky white and opaque, changing gradually to pinkish upon exposure, and finally reddish or brown. It has a persistent alliaceous or garlic-like odor, and a bitter alliaceous, acrid taste. When triturated with water, it yields a milk-white emulsion. Not less than 50 per cent. should dissolve in alcohol, and, when incinerated, should yield not more than 15 per cent. of ash.

In its purest form, asafetida *contains* about 6 to 9 per cent. of light yellow, volatile oil, 60 to 70 per cent. of resin, and 20 to 30 per cent. of gum, in addition to a small percentage of *ferulaic acid, vanillin, formic, acetic, oleic,* and *malic acids.* Most of the asafetida found in the shops is adulterated with red clay, twigs, and leaves.

Action and Uses.—Asafetida is mildly sedative to the nervous system; antispasmodic, and stimulating to the bronchial, gastric, and intestinal mucous membrane, and a mild, diffusible stimulant to the circulation. It is *used* as a mild, stimulating expectorant in *bronchitis,* to relieve *flatus* and *tympany,* to promote digestion, to stimulate peristalsis in *chronic constipation,* and to relieve *nervous irritability.*

Dose.—0.3 to 0.6 Gm.; 5 to 10 grains.

Official Preparations

Emulsum Asafœtidæ (*Emulsion of Asafetida*). *Synonym*, Milk of Asafetida.—Made by rubbing 40 Gm. of Asafetida with 1000 Cc. of Water. Dose 1-2 table spoons.

Tinctura Asafœtidæ (*Tincture of Asafetida*).—Made by macerating 200 Gm. of Asafetida with 750 Cc. of Alcohol, and adding sufficient alcohol to make 1000 Cc. Dose 10 mL ti 1 f ʒ

Pilulæ Asafœtidæ (*Pills of Asafetida*).—Each pill contains about 3 grains (0.2 Gm.) of Asafetida and 1 grain (0.06 Gm.) of Soap.

Dose.—16 Cc.; f ʒiv.

ASPIDIUM—Aspidium

Family, Filices. *Synonym*, Male Fern.

The dried root of *Dryopteris filix-mas* (Linné), Schott, or of *Dryopteris marginalis*. In the growing state both varieties are tall, handsome ferns with horizontal creeping roots, stems, or rhizomes. Dryopteris filix-mas may be found growing throughout the north temperate zone and in the tropics, in mountainous regions of both hemispheres, while Dryopteris marginalis is collected in the United States and Canada. The drug should be collected in late summer or early autumn. Stripped of its stipe, base, or remains of its fronds, and of its brown, glossy, transparent, chaffy scales, it is seen as pale green (later turning brown), slightly curved, cylindraceous segments from ½ to 1 inch (12 to 24 mm.) thick. The segments have a rather spongy texture, a disagreeable odor, and a bitter-sweet, acrid, astringent, and nauseous taste. As the therapeutic properties of the drug depend upon principles which are volatile, the official preparations should be made from rhizomes which have been recently collected.

Aspidium depends for its anthelmintic properties upon *filmaron*, *albaspidin*, and *filicic acid*, and also contains a fixed oil, a volatile oil, resin, and filix-tannic acid, all of which are soluble in acetone, and which are contained in the official oleoresin.

Action and Uses.—Preparations of aspidium are the most efficient and commonly used teniafuges or remedies employed to bring about the expulsion of *tapeworms*. When given in excessive doses, or if allowed to remain in the alimentary canal too long before being followed by a purge, the drug being an irritant, may give rise to symptoms of gastro-enteritis and inflammation of the kidneys, or, through absorption, produce convulsions, coma, and collapse, which may be so severe as to lead to a fatal issue.

Administration.—The crude drug is rarely employed, the oleoresin being more active. The oleoresin may be *administered* in capsules, or made into an emulsion. The patient should abstain from food for

twelve to twenty-four hours before taking the oleoresin, which may be given at a single dose, or in three or four broken doses at intervals of from fifteen to thirty minutes, and followed in one hour by a brisk purge. As castor oil is likely to increase the absorption of the oleoresin, it should not be administered either with or soon after it; a brisk saline purge should be employed. It is not a safe drug to administer to children or to feeble adults.

Official Preparation

Oleoresina Aspidii (*Oleoresin of Aspidium*). *Synonym*, Oleoresin of Male Fern.—Made by percolating aspidium with acetone until exhausted and then distilling and evaporating. Upon standing, filicic acid deposits as a granular crystalline precipitate separate from the oleoresin, which should be well shaken before used.

Dose.—2 to 4 Gm.; 30 to 60 minims.

AURANTII FLORUM—Orange Flowers

The partly expanded flowers of either the sweet or bitter orange. Orange flowers are not official, but on account of their fragrant oil are used commercially in making several pharmaceutical products, all of which are employed as agreeable flavoring agents or vehicles.

Official Preparations

Aquæ Aurantii Florum (*Orange-flower Water*).—Water saturated with a volatile oil of fresh orange flowers, obtained as a by-product in the distillation of the oil of orange flowers. *Used* as an agreeable vehicle, and as a pleasant lotion.

Syrupus Aurantii Florum (*Syrup of Orange Flowers*).—Made by dissolving Sugar in Orange-flower Water, without the aid of heat. *Used* as a pleasant vehicle.

AURANTII AMARI CORTEX—Bitter-orange Peel

Family, Rutaceæ.

The dried rind of the unripe fruit of *Citrus vulgaris*, a bitter orange which grows in India and Ceylon.

Action and Uses.—The bitter-orange peel is not used to communicate flavor to official preparations and prescriptions, but as a bitter tonic. It is one of the ingredients in the Compound Tincture of Cinchona, and the Compound Tincture of Gentian.

Official Preparations

Fluidextractum Aurantii Amari (*Fluidextract of Bitter-orange Peel*).—Fluidextract of Bitter-orange Peel is made with a menstruum of 2 parts of Alcohol and 1 part of Water.

Dose.—0.3 to 1 Cc., 5 to 16 mims.

Tinctura Aurantii Amari (*Tincture of Bitter-orange Peel*).—A 20 per cent. Tincture of Bitter-orange Peel made with a menstruum of 3 parts of Alcohol and 2 parts of Water.

Dose.—2 Cc. to 4 Cc.; ½ to 1 f℥.

AURANTII DULCIS CORTEX—Sweet-orange Peel

Family, Rutaceæ.

The recently separated outer rind of the ripe fruit of *Citrus aurantium*.

This sweet-orange peel owes its value to the highly fragrant volatile oil found in the epidermis, and also to the fact that it communicates a yellow color to preparations made with it. It is *used* entirely as an aromatic and flavoring substance.

Official Preparations

Syrupus Aurantii (*Syrup of Orange*).—Made by triturating 50 Cc. of Tincture of Sweet-orange Peel with 10 Gm. of Magnesium Carbonate, adding gradually 400 Cc. of Water, filtering, washing, and adding enough water through the filter to make 450 Cc. of filtrate, dissolving in this filtrate 5 Gm. of Citric Acid and 820 Gm. of Sugar, and adding enough water to make 1000 Cc.

Tinctura Aurantii Dulcis (*Tincture of Sweet-orange Peel*).—Made by macerating 50 Gm. of Sweet-orange Peel with Alcohol to make 100 Cc., filtering through purified cotton, passing enough menstruum through the residue to make 100 Cc. of tincture, and finally filtering through paper.

Dose.—2 to 4 Cc.; ½ to 1 f℥.

Oleum Aurantii Corticis (*Oil of Orange Peel*).—A volatile oil obtained by expression from the fresh peel of sweet oranges. *Used* as a flavoring agent.

AURI ET SODII CHLORIDUM—Gold and Sodium Chloride

Gold and sodium chloride is a mixture of equal parts by weight of anhydrous Gold Chloride ($AuCl_3$) and anhydrous Sodium Chloride (NaCl), representing not less than 30 per cent. of metallic gold. It is an orange-yellow powder, odorless, having a saline metallic taste,

is slightly deliquescent upon exposure to damp air, freely soluble in water, and only partially soluble in alcohol. This preparation is not a double salt, but simply a mechanical mixture of the two chlorides.

Action and Uses.—Gold and sodium chloride has been greatly praised by some physicians as a powerful alterative tonic and sedative to the nervous system; by others it has been condemned as perfectly useless as a medicine. Its action upon the system is practically unknown, and, without doubt, properties have been attributed to the chemical which it does not possess. It has been *used* in *cirrhosis of the liver, chronic interstitial nephritis, locomotor ataxia, syphilis,* and *sexual impotence.* It is best *administered* in pill form.

Incompatibilities.—Gold and sodium chloride is chemically altered and precipitated from solution by albumin, mercurous compounds, solution of potassium arsenite, ferrous sulphate, soluble iodides, and many organic substances.

Dose.—0.003 to 0.006 Gm.; $\frac{1}{20}$ to $\frac{1}{10}$ grain.

BALSAMUM PERUVIANUM—Balsam of Peru

Family, Leguminosæ.

Balsam of Peru is a viscid, dark brown, balsamic liquid obtained as an exudate from wounded trees of *Toluifera pereiræ,* found chiefly in San Salvador. It is free from stickiness or stringiness, is transparent, and reddish brown in thin layers; of an agreeable, vanilla-like odor, and a bitter acrid taste, with a persistent after-taste. When swallowed, it leaves a burning sensation in the throat. It does not harden upon exposure to air, is completely *soluble* in absolute alcohol, chloroform, and glacial acetic acid, and soluble in 5 parts of alcohol with not more than a slight opalescence. The balsam contains *cinnamic* and *benzoic acid, benzyl cinnamate,* resin, and *benzyl benzoate.*

Action and Uses.—Balsam of Peru is a stimulant to the mucous membrane, and is administered in treating *bronchitis, chronic laryngitis, diarrhœa, dysentery,* and *inflammation of the bladder and urethra.* It is also used *locally* as a dressing for *ulcers, fissures,* and *chilblains.* Being insoluble in water, it is *administered* on sugar, in capsules, or made into an emulsion. There are no official preparations of it.

Dose.—0.6 to 2 Gm.; 10 to 30 grains.

BALSAMUM TOLUTANUM—Balsam of Tolu

Family, Leguminosæ.

It is collected as an exudate from wounded trees of *Toluifera balsamum* growing in the highlands of Venezuela and Colombia. It is a yellowish-brown, plastic solid, becoming brittle when old, dried, or exposed to cold; it has a pleasant aromatic odor, recalling that of vanilla,

a mild aromatic taste, is *soluble* in alcohol, chloroform, and the solutions of the fixed alkalies, but almost entirely insoluble in water. It contains *benzyl benzoate, benzyl cinnamate, toluene*, 18 to 20 per cent. of free *cinnamic acid*, 75 to 80 per cent. of resin, and a small percentage of *benzoic acid*.

Action and Uses.—The preparations of balsam of tolu are used as stimulating expectorants in *subacute* and *chronic bronchitis*. The syrup, in addition to its use as an expectorant, furnishes a most agreeable flavoring agent in *cough* mixtures. The balsam is also used as a *coating for pills* of phosphorus, and pills of ~~ferric~~ iodide.

Official Preparations

Tinctura Tolutana (*Tincture of Tolu*).—Made by dissolving 20 Gm. of Balsam of Tolu in enough Alcohol to make 100 Cc. of tincture of tolu.

Used as an expectorant, and also for making Syrup of Tolu. It may be *administered* on sugar.

Dose.—1 to 2 Cc.; 15 to 30 minims.

Syrupus Tolutanus (*Syrup of Tolu*).—Made with 5 Cc. of Tincture of Tolu with enough Sugar and Water to make 100 Cc.

Dose.—4 to 8 Cc.; 1 to 2 f3.

BELLADONNÆ FOLIA—Belladonna Leaves
BELLADONNÆ RADIX—Belladonna Root

Family, Solanaceæ.

Both the leaves and the root of *Atropa belladonna*, known as Deadly Night Shade, are official, and a number of official preparations are made from each. Both depend on the same mydriatic alkaloids for their physiological action and uses; the root being richer in mydriatic alkaloids than the leaves. The plant is a native of central and southern Europe, Asia Minor, and Algeria, and is cultivated in Germany, France, England, and North America. It is a bushy perennial, about 3 to 5 feet (1 to 1.5 M.) high, has a smooth, thick, purplish stem, blooms in June or July, its flowers being dark purplish in color and bell-shaped; the fruit is a dark purple berry about the size of a cherry.

Belladonna leaves are about from 2 to 8 inches (5 to 20 cm.) long, 2 to 5 inches (5 to 12 cm.) broad, broadly ovate, apex acute, margin entire narrowed into the petiole. As seen in the shops, they are dry, of a dull, brownish-green color, much wrinkled and matted together; their odor is distinctly narcotic, especially upon moistening; their taste is somewhat bitter and acrid. Upon assay, the leaves should yield not less than 0.3 per cent. of mydriatic alkaloids.

Belladonna root is official in the form of dry, cylindrical or somewhat tapering, longitudinally wrinkled, split, curved pieces, ½ to 1

inch (12 to 25 mm.) thick; pale brownish gray externally, whitish internally. Its taste is sweetish, afterward bitterish and strongly acrid. Upon assay, the root should yield not less than 0.45 per cent. of mydriatic alkaloids. Both the leaves and the root owe their activity to mydriatic alkaloids, chiefly atropine and hyoscyamine. The Solanaceæ family, to which belladonna belongs, furnishes several other official drugs similar in action and uses; these are: *Scopola*, yielding upon assay not less than 0.5 per cent., *stramonium*, yielding not less than 0.35 per cent., and *hyoscyamus*, yielding not less than 0.08 per cent. of mydriatic alkaloids.

Action and Uses.—Belladonna, or its alkaloids, in full medicinal doses quickens the pulse, contracts the bloodvessels of the splanchnic area, dilates the bloodvessels of the skin, thereby, in full doses, causing decided redness of the skin; it is a stimulant to the respiratory centres; an excitant to the brain; a depressant to the sensory nerves; a sedative and antispasmodic to unstriped muscles, and increases peristaltic movements of the intestines; it checks all the secretions except the urine; dilates the pupils, raises intra-ocular tension, and paralyzes accommodation. It is *used* in treating *shock* or *sudden collapse;* to check *excessive secretions*, especially from the skin or breasts; as an antispasmodic in treating *intestinal cramps;* to *prevent griping* when given with purgative medicines; to allay the *pain* of *renal* or *hepatic colic;* to relieve *vesical spasms;* to allay *spasmodic cough*, and to relieve *neuralgic pain*. Atropine is similar in action to belladonna, is more suitable for hypodermic use, and is extensively employed as a mydriatic by ophthalmic surgeons. Full physiological effects are often observed after the local application of the ointment, plaster, or liniment of belladonna.

Poisonous Action.—The overaction of belladonna or its alkaloids is quite pronounced, and sometimes alarming, but the drug is probably less toxic than it is commonly thought to be. In overdoses it produces marked reddening of the skin, extreme dryness of the mouth and pharynx, marked dilatation of the pupils, and talkative delirium. These symptoms are commonly followed by a prolonged deep sleep.

Official Alkaloid

Atropina (*Atropine*). *Formula*, $C_{17}H_{22}NO_3$ = 287.04.—An alkaloid obtained from *Atropa Belladonna*, and other plants of the Solanaceæ family. As it occurs in commerce it is usually accompanied by a small amount of hyoscyamine, from which it cannot be readily separated.

Atropine is seen in white, rhombic prisms, more or less elongated in the direction of the major axis, as they contain more or less hyoscyamine. It is alkaline in reaction; *soluble* in 450 parts of water, 1.46 parts of alcohol, 16.6 parts of ether, and 1.5 parts of chloroform. On account of its slight solubility in water it is far less used than atropine sulphate, which is quite soluble in water.

Dose.—0.0003 to 0.0008 Gm.; $\frac{1}{200}$ to $\frac{1}{75}$ grain.

Atropinæ Sulphas (*Atropine Sulphate*). *Formula*, $(C_{17}H_{23}NO_3)_2.H_2SO_4$ = 671.43.—A white, crystalline powder, or microscopic needles and prisms (the form of the latter being probably due to the hyoscyamine present). It is *soluble* in 0.38 part of water, 3.7 parts of alcohol, and only sparingly soluble in chloroform or ether.

Action and Uses.—The action and uses of atropine sulphate are similar to those of belladonna.

Incompatibilities.—Atropine is precipitated from solution by the ordinary alkaloidal reagents, except platinic chloride. (See incompatibilities of alkaloids.) Upon the addition of alkali hydroxides, and carbonates of the fixed alkalies (not ammonium carbonate), to a solution containing atropine sulphate, the salt is decomposed and the free alkaloid is precipitated.

Dose.—0.0003 to 0.001 Gm.; $\frac{1}{200}$ to $\frac{1}{60}$ grain.

Oleatum Atropinæ (*Oleate of Atropine*).—A soft, unctuous preparation containing 2 per cent. of Atropine dissolved in 50 per cent. of Oleic Acid and 50 per cent. of Olive Oil. It is *used* for the purpose of obtaining the local effect of atropine by inunction. As absorption is likely to follow its application, the preparation should be used cautiously, and in small quantities only.

Official Preparations from Belladonna Leaves

Extractum Belladonnæ Foliorum (*Extract of Belladonna Leaves*).—An extract of pilular consistency prepared from belladonna leaves, yielding, upon assay, 1.4 per cent. of mydriatic alkaloids. The extract enters into the composition of Belladonna Plaster; Compound Laxative Pills, and Pills of Podophyllum, Belladonna, and Capsicum.

Dose.—0.01 to 0.015 Gm.; $\frac{1}{6}$ to $\frac{1}{4}$ grain.

Emplastrum Belladonnæ (*Belladonna Plaster*).—A plastic solid made by incorporating 30 parts of Extract of Belladonna Leaves with 70 parts of Adhesive Plaster. It should contain not less than 0.38 per cent., nor more than 0.42 per cent., of mydriatic alkaloids. When spread, by the aid of heat, upon chamois skin or other suitable material, it is used for the purpose of obtaining the local effect of belladonna. Systemic effect is often noted after its application.

Tinctura Belladonnæ Foliorum (*Tincture of Belladonna Leaves*).—Made by percolating 10 Gm. of Belladonna Leaves with enough Diluted Alcohol to make 1000 Cc. of tincture. It should contain 0.035 Gm. of mydriatic alkaloids in 100 Cc. of tincture.

Dose.—0.3 to 1 Cc.; 5 to 15 minims.

Unguentum Belladonnæ (*Ointment of Belladonna*).—A soft, solid, unctuous preparation, made by incorporating 10 parts of Extract of Belladonna Leaves, softened by alcohol, with 20 parts of Hydrous Woolfat and 65 parts of Benzoinated Lard. *Used* locally usually to obtain the local effect of belladonna, but occasionally for the purpose of systemic effect.

Official Preparations from Belladonna Root

Fluidextractum Belladonnæ Radicis (*Fluidextract of Belladonna Root*).—Made by the usual process for preparing fluidextracts. The menstruum being in the proportion of Alcohol, 4 parts; Water, 1 part. It should contain 0.4 Gm. of mydriatic alkaloids in each 100 Cc. of fluidextract.

Dose.—0.06 to 0.12 Cc.; 1 to 2 minims.

Linimentum Belladonnæ (*Belladonna Liniment*).—Made by dissolving 5 Gm. of Camphor in a sufficient quantity of Fluidextract of Belladonna Root to make 100 Cc.

Used externally to obtain the local effect of belladonna. If used too freely, systemic action results.

BENZALDEHYDUM—Benzaldehyde

Synonym, Artificial oil of Bitter Almond. *Formula,* C_7H_6O = 105.25.

An aldehyde produced artificially, or obtained from natural oil of bitter almond or other oils, and containing not less than 85 per cent. of pure benzaldehyde ($C_6H_5.COH$). It is a colorless, strongly refractive liquid, having a bitter almond-like odor and a burning aromatic taste, is freely *soluble* in alcohol, ether, and fixed and volatile oils, but only sparingly soluble in water. Artificial benzaldehyde is made by acting upon hot toluene with chlorine, and treating the resulting product with manganese dioxide or other oxidizing agents. It may be made from oil of bitter almond by shaking the oil with milk of lime and a solution of ferrous sulphate, which is placed aside for several days and then distilled. By this means, the oil of bitter almond is freed from hydrocyanic acid. This synthetic oil of almond is not similar to the nitrobenzol known as the oil of myrbane, which is made by the action of nitric acid upon benzene.

Action and Uses.—On account of its agreeable odor, it is extensively employed as a flavoring agent in the place of the oil of bitter almond, and it is much safer.

Dose.—0.03 to 0.06 Gm.; ½ to 1 minim.

BENZINUM—Benzin

Synonym, Petroleum Benzin.

A distillate from American petroleum consisting of hydrocarbons, chiefly from the marsh-gas series (C_5H_{12}, C_6H_{14}, and homologous compounds). It should be carefully kept in well-stoppered bottles or in tin cans, in a cool place, and remote from light and fire. It is a transparent, colorless, diffusive liquid, of a characteristic odor, slightly resembling that of petroleum, but is much less disagreeable, and has

a neutral reaction. It is inflammable, its vapor, when mixed with air and ignited, explodes violently. Petroleum benzin is insoluble in water, but is *soluble* in 6 parts of alcohol and readily soluble in ether, chloroform, benzene, fixed and volatile oils, with the exception of castor oil.

Action and Uses.—Petroleum benzin is not used internally, but is employed locally in the treatment of *scabies*, *favus*, and other parasitic diseases. In pharmacy, it is used as a solvent for oils, fats, and resins; as a household article, it is extensively employed as a cleansing agent. On account of its inflammability and of the explosive properties of its vapor when mixed with air and ignited, it should not be brought near a flame, nor used in a room where there is an open fire or flame.

Official Preparation

Benzinum Purificatum (*Purified Petroleum Benzin*).—Petroleum benzin which has been purified of its contamination with sulphur compounds and other impurities, by treating it with potassium permanganate, sodium hydroxide, and sulphuric acid. On account of its greater purity, this form of benzin is to be preferred for use for medicinal purposes.

BENZOINUM—Benzoin

Natural Order, Styraceæ.

Benzoin is a balsamic resin obtained from *Styrax Benzoin*, a handsome tree of medium height, growing wild and also cultivated in Sumatra, Borneo, Malay Peninsula, Laos, and Siam. From longitudinal or oblique incisions made through the bark of the tree between the ground and the first branches, a thin balsamic resin exudes, which, upon exposure to the air and sun, becomes inspissated, after which it is collected by being scraped off with a knife. In its official form, the balsamic resin is in pebble-like tears, about $\frac{1}{5}$ to 2 inches (5 to 50 mm.) long, and about one-fourth as thick; yellowish or rusty brown externally; upon fresh fracture, milky-white internally. The tears are sometimes seen in agglutinated masses. The drug has an agreeable balsamic odor, a slightly acrid taste, becomes soft when warmed, yields benzoic acid on sublimation; *dissolves* almost wholly in 5 parts of warm alcohol; is soluble in a solution of potassium or sodium hydroxide, and when incinerated should yield not more than 2 per cent. of ash. In addition to about 12 to 24 per cent. of *benzoic acid*, benzoin contains *cinnamic acid*, *vanillin*, *styrol*, and volatile oil.

Action and Uses.—As a therapeutic agent, it depends almost wholly upon benzoic acid, which is a mild antiseptic and germicide. This acid in concentrated form acts more or less as an irritant, and not infrequently, when administered to persons peculiarly susceptible to its influence, gives rise to urticaria. The acid is eliminated by the urine as hippuric acid and increases the acidity of the urine. It is

used to overcome *alkalinity in the bladder* in cases of *subacute* or *chronic inflammations* of that organ, and in *phosphaturia*. The tincture of benzoin, when painted over slight wounds and abrasions, acts as a mild antiseptic, and, upon evaporation, forms a protective dressing. Inhalation of the vapor of tincture of benzoin, added to very hot water, is of value in treating *acute laryngitis*. The compound tincture of benzoin, like the tincture, is used as a mild antiseptic and protecting dressing, and also internally as an expectorant. The balsamic resin, as such, is rarely administered, but may be employed as an expectorant, or as an intestinal antiseptic. If suspended in warm melted lard it imparts to it an agreeable odor, and yields to it benzoic acid, which acts as preservative.

Dose.—0.3 to 1 Gm.; 5 to 15 grains.

Official Preparations and Derivative

Acidum Benzoicum (*Benzoic Acid*). *Formula*, $HC_7H_5O_2$.—An organic acid ($C_6H_5.COOH$), obtained from *Benzoin* by sublimation, or prepared artificially. (See Acidum Benzoicum.)

Dose.—0.6 to 2.5 Gm.; 10 to 40 grains.

Adeps Benzoinatus (*Benzoinated Lard*).—Prepared by digesting Benzoin with Lard, straining, and stirring while cooling. This preparation has an agreeable odor and does not become rancid so readily as lard, and is therefore a useful ointment basis.

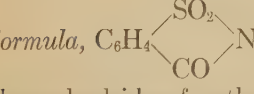
Tinctura Benzoini (*Tincture of Benzoin*).—Made by the process of maceration, 200 Gm. of Benzoin with Alcohol a sufficient quantity to make 1000 Cc. of the finished product being employed. The tincture is precipitated by water or aqueous liquids.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

Tinctura Benzoini Composita (*Compound Tincture of Benzoin*).—This tincture was made official to take the place of a popular liquid known as Turlington's Balsam. It is prepared by the process of maceration, 100 Gm. of Benzoin, 20 Gm. of Purified Aloes, 80 Gm. of Storax, 40 Gm. of Balsam of Tolu, with Alcohol a sufficient quantity to make 1000 Cc. of the finished product being used. Water or aqueous liquids precipitate the resins from the tincture.

Dose.—2 to 4 Cc.; ½ to 1 f℥.

BENZOSULPHINIDUM—Benzosulphinide, Saccharin, Glusidum



Formula, $C_6H_4\begin{matrix}SO_2\\ \diagdown\ \diagup\\ CO\end{matrix}NH = 181.77.$

The anhydride of ortho-sulphamide-benzoic acid (benzoyl sulphonic-imide), made synthetically.

A white, crystalline powder, nearly odorless, having an intensely

sweet taste even in dilute solution. It is *soluble* in 250 parts of water, 25 parts of alcohol; easily soluble in ammonia water, in alkali hydroxide solutions, and in a solution of sodium bicarbonate, with the evolution of carbon dioxide.

Action and Uses.—This substance, which is many times sweeter than sugar, is not converted into glucose when taken as a food. It is employed entirely as a substitute for sugar to sweeten the foods of *diabetic* or *gouty patients*, or in other cases where sugar would be injurious. It has been claimed by some that by prolonged use saccharin is liable to give rise to digestive disturbances.

Dose.—0.06 to 0.3 Gm.; 1 to 5 grains.

BERBERIS—Berberis

Synonym, Barberry. *Family*, Berberidaceæ.

The rhizome and roots of *Berberis aquifolium* Pursh, and other species of berberis (family *Berberidaceæ*).

The shrubs and small trees from which the rhizome and roots are collected are widely distributed throughout the temperate zones, including the mountains of the United States. It is known under several names—one, Oregon grape root; another, as Rocky Mountain grape, Holly-leaved barberry, and again as California barberry. The rhizome is seen in more or less knotty, irregular pieces of varying length, and from $\frac{1}{8}$ to 1 inch (3 to 25 mm.) in diameter; bark from $\frac{1}{50}$ to $\frac{1}{12}$ inch ($\frac{1}{2}$ to 2 mm.) thick; wood yellowish, distinctly radiate, with narrow medullary rays, hard and tough; rhizome with a small pith; odor distinct; taste strongly bitter. Pieces without the bark should be rejected. Its most active principle is *berberine*.

Action and Uses.—In moderate doses, the fluidextract of berberis is a tonic, stimulant, and antiperiodic; in large doses, it is an active cathartic and hepatic stimulant.

Official Preparation

Fluidextractum Berberidis (*Fluidextract of Berberis*).—Made with a menstruum of diluted alcohol.

Dose.—As a tonic and stimulant, 0.12 to 0.3 Cc.; 2 to 5 minims. As a laxative and stimulant, 0.6 to 1 Cc.; 10 to 15 minims.

BETANAPHTHOL—Betanaphthol

Formula, $C_{10}H_7OH = 142.98$.

A monatomic phenol occurring in coal tar, but usually prepared from naphthalene.

It is a colorless or pale, buff-colored, shining crystalline laminæ or a

white or yellowish-white crystalline powder, having a faint phenol-like odor, and a sharp and pungent, but not persistent taste. It is almost insoluble in water, but is *soluble* in less than its own weight in alcohol.

Action and Uses.—Betanaphthol limits or prevents fermentation when administered internally, and is used in the treatment of the various forms of *gastro-intestinal disturbances* accompanied by *fermentation.*

Incompatibilities.—Betanaphthol liquefies when triturated with antipyrine, camphor, phenol, and menthol.

Dose.—0.06 to 0.3 Gm.; 1 to 5 grains.

BISMUTH COMPOUNDS

The metal bismuth is crystalline, brittle, pulverizable, brilliant, silver colored. It is found in the metallic state, and also as a sulphide. The metal is not used as a medicine, but several of its salts are official and are highly valued as astringents. The compounds of bismuth, with the exception of bismuth and ammonium citrate, are insoluble in water or alcohol, and should be *dispensed* as a powder or mixture. Hydrogen sulphide or ammonium sulphide, if added to a solution containing bismuth, precipitate it as a black sulphide. Sulphides brought into contact with any of the salts changes them to the black bismuth sulphide. Water, if added to a strongly acid solution of bismuth, throws down a heavy, white precipitate of the subsalt. Formerly the compounds of bismuth were frequently contaminated by arsenic, but at present little is to be feared from this source. By reason of sulphide in the intestinal tube, the bowel movements are always very black after any of the bismuth compounds have been taken. When long taken, the compounds of bismuth may impart a garlicky odor to the breath, by reason of its slight contamination by tellurium.

Official Salts

Bismuthi Citras (*Bismuth Citrate*). *Formula*, $BiC_6H_5O_7 = 394.52$.—Bismuth citrate is a white, amorphous or microcrystalline powder, free from odor and tasteless; *insoluble* in water or alcohol, but dissolves in ammonia water and in solutions of alkali citrates. The salt is obtained by boiling bismuth subnitrate in a concentrated aqueous solution of citric acid until it is dissolved, and then adding water to precipitate the salt.

Action and Uses.—Bismuth citrate is an astringent. It is occasionally administered to check *serous diarrhœa,* but is almost exclusively employed in making Bismuth and Ammonium Citrate.

Dose.—0.12 to 0.3 Gm.; 2 to 5 grains.

Bismuthi et Ammonii Citras (*Bismuth and Ammonium Citrate*).—Shining, pearly, or transparent scales, becoming opaque, with loss of ammonia, upon exposure. The compound is *very soluble* in water,

and sparingly soluble in alcohol. It is made by dissolving bismuth citrate in ammonia water, evaporating and scaling.

Action and Uses.—Bismuth and ammonium citrate is an astringent, but not a sedative, and was introduced into the pharmacopœia to furnish an official soluble compound of bismuth. It is *used* in the treatment of *diarrhœa.*

Incompatibilities.—The compound is not suitable for combination, being readily decomposed by many substances. It is blackened and precipitated by sulphides; decomposed and precipitated by mineral acids and strong organic acids, and slowly decomposed by the alkali hydroxides.

Dose.—0.12 to 0.3 Gm.; 2 to 5 grains.

Bismuthi Subcarbonas (*Bismuth Subcarbonate*).—A heavy, white, or pale yellowish-white powder, varying somewhat in chemical composition; free from odor, tasteless, and *insoluble* in alcohol or water. The compound is made by the addition of an aqueous solution of sodium carbonate to a solution of bismuth dissolved in nitric acid, and collecting, purifying, washing, and drying the precipitate.

Action and Uses.—Bismuth subcarbonate, when applied to inflamed surfaces, adheres and acts as an astringent and local sedative. Like bismuth subnitrate, it is highly valued in treating *acute* and *subacute inflammations of the gastro-intestinal tract.* To check *diarrhœa* it should be prescribed in full doses, so it may form a protecting, mildly astringent coating upon the mucous membrane of the bowel. Applied *locally* to moist *ulcers,* or moist *inflammatory diseases of the skin,* it acts as an astringent and protecting dressing. This salt may be *prescribed* in powders, or as a mixture, the latter to be well shaken at the time of administering. For obvious reasons, such an insoluble substance should not be prescribed in the form of compressed tablets.

Incompatibilities.—Bismuth subcarbonate is more or less slowly decomposed by mineral acids, strong organic acids, and by alkali hydroxides. Soluble iodides form with it insoluble bismuth iodide; tannic acid, a yellow bismuth tannate; sulphides, black bismuth sulphide. Chlorine and chlorinated compounds oxidize it, forming red bismuth peroxide; solutions of hydrogen peroxide also oxidize it.

Dose.—0.3 to 2 Gm.; 5 to 30 grains.

Bismuthi Subgallas (*Bismuth Subgallate*). *Synonym,* Dermatol.—Bismuth subgallate is a light, amorphous, bright yellow powder, varying somewhat in chemical composition, without odor or taste, and *insoluble* in water or alcohol. It may be made by adding a solution of gallic acid to bismuth subnitrate dissolved in an aqueous solution of glacial acetic acid, and collecting, washing, and drying the precipitate thus formed.

Action and Uses.—Bismuth subgallate is astringent and feebly germicidal. It is *used internally* in *acute* and *subacute inflammations of* the *stomach* and *intestines,* particularly in those cases accompanied

by putrefaction or diarrhœa. *Locally*, it is employed as a mild astringent antiseptic dressing for *skin ulcers* and moist *inflammatory diseases of the skin*. The compound is best *prescribed* in powders or capsules.

Incompatibilities.—Soluble iodides, sulphides, alkali hydroxides, and mineral acids decompose bismuth subgallate.

Dose.—0.3 to 1 Gm.; 5 to 15 grains.

Bismuthi Subnitras (*Bismuth Subnitrate*).—Bismuth subnitrate is a heavy, white, odorless, tasteless powder, *insoluble* in water or alcohol, and varying somewhat in chemical composition. It may be made by dissolving bismuth in nitric acid, purifying from arsenic, and adding the solution in nitric acid to water so as to precipitate bismuth subnitrate.

Action and Uses.—Bismuth subnitrate is a mild astringent. Like the subcarbonate, it is *used* internally in treating *acute* and *subacute inflammations of the stomach* and *bowels*, particularly in *gastric ulcers*, *vomiting*, and *diarrhœal diseases*. Locally, it is employed as a drying and protecting dressing for *ulcers*, and for moist *inflammatory diseases of the skin*. To be of value for diarrhœa, it should be administered in full doses. Being tasteless and insoluble, it should be *prescribed* as a powder, or in a mixture, preferably the former; never in compressed tablets. By reason of the presence of sulphides in the mouth, the tongues of persons taking bismuth compounds are likely to become stained black, while, by reason of sulphide in the intestines, the passages from the bowels are invariably dark green or black.

Incompatibilities.—In water, bismuth subnitrate slowly decomposes, liberating nitric acid; alkali hydroxides in solution change it into bismuth hydroxide; alkali carbonates and bicarbonates convert it into bismuth subcarbonate and liberate carbon dioxide. In the presence of moisture, tannic acid forms with it a yellow bismuth tannate; soluble iodides form with it bismuth iodide; solution of hydrogen dioxide gives with it a reddish-brown precipitate of bismuth peroxide.

Dose.—0.3 to 2 Gm.; 5 to 30 grains.

Bismuthi Subsalicylas (*Bismuth Subsalicylate*).—Bismuth subsalicylate is a white or nearly white, amorphous, or crystalline powder, of somewhat varying chemical composition. It is tasteless, odorless, and almost entirely *insoluble* in water. This compound may be prepared by adding a concentrated solution of sodium salicylate to a solution in glycerin of normal bismuth nitrate, and collecting, washing, and drying the precipitate thus formed.

Action and Uses.—Bismuth subsalicylate is a mild astringent and feeble germicide. It is *used* in treating *fermentative diarrhœa*. It is best *prescribed* in powders or capsules.

Incompatibilities.—The salt is decomposed by mineral acids, alkalies, iodides, and sulphides. Solutions of ferric salts give with it a violet color.

Dose.—0.3 to 0.6 Gm.; 5 to 10 grains.

BROMIDES

Ammonium, *potassium*, *lithium*, *sodium*, *strontium*, *calcium*, and *zinc bromides* are official. They are used for the same purposes, and have many similar physical and chemical properties. They are all freely *soluble* in water and aqueous liquids, they are all colorless or white crystals, they all have a salty taste, all have a tendency to attract moisture and become damp, or liquefy in moist atmosphere, and all are decomposed by mineral acids, with the liberation of bromine.

Action and Uses.—The official bromides are useful as medicinal agents on account of their sedative effect upon the nervous system. Bromides depress the motor and intellectual areas of the brain, thereby producing sleep, alleviating mental excitement, and preventing convulsions of cerebral origin; they depress the motor and also the sensory tracts of the spinal cord, and thereby act as antispasmodics, and prevent convulsions of spinal origin. The conditions and diseases in which the bromides are used in medicine are *insomnia*, *mental excitement*, *epilepsy*, *infantile convulsions*, *croup*, *headaches*, *backaches*, *vomiting*, *nervous cough*, *priapism*, *nymphomania*, and similar conditions in which there is *nervous excitement*. When long continued, or taken in large doses, the bromides give rise to "bromism," a condition which is characterized by the development of coryza, hebetude, painful acne of the face, body, head, and mouth; if continued longer, stupor deepens, all the other symptoms are magnified, there is rather profuse salivation with excoriation of the lips and chin, the breath becomes foul, and the mammæ or testicles undergo atrophy. As a rule, the alkali bromides are best *prescribed* in aqueous liquids, but if desired may be dispensed in compressed tablets.

Incompatibilities.—Soluble bromides and hydrobromic acid precipitate, from solution, the salts of mercury, lead, and silver. Alkali bromides change calomel to a gray or black color, and precipitate many alkaloidal salts from solution. Nitric acid, chlorine, and acidulated solution of chlorates, permanganates, and spirit of nitrous ether liberate bromine, changing the solution to a reddish-brown color.

Official Bromides

Ammonii Bromidum (*Ammonium Bromide*).—*Formula*, NH_4Br = 97.29. The salt occurs as colorless, transparent, prismatic crystals, or as a white crystalline powder. It is odorless, has a pungent, saline taste, is permanent in dry air, but attracts moisture in a moist atmosphere. It is *soluble* in 1.2 parts of water and in 12.5 parts of alcohol. Aqueous solutions change blue litmus paper to red. Upon exposure to the air, the salt gradually acquires a yellow color and an acid reaction. When heated, it volatilizes completely, without fusing. It may be

made by dissolving bromine in ammonia water, or by adding ammonia water to an aqueous solution of ferrous bromide, filtering, and evaporating.

Action and Uses.—In action and uses ammonium bromide is similar to other alkali bromides, except that it is probably less depressing to the circulation than potassium bromide, while symptoms of bromism are more likely to develop after ammonium bromide than after potassium bromide.

Incompatibilities.—In the dry state, it is decomposed, with the liberation of ammonia gas, by fixed alkali hydroxides or carbonates, or by the hydroxides of barium, calcium, or strontium. In solution, it precipitates the salts of lead, silver, and mercury. In solution with spirit of nitrous ether which has become acid by long keeping, potassium permanganate, nitric acid, and chlorine, it liberates bromine, giving the solution a reddish-brown color.

Dose.—0.6 to 4 Gm.; 10 to 60 grains.

Calcii Bromidum (*Calcium Bromide*).—*Formula*, $CaBr_2$ = 198.52. A white, granular, odorless, very deliquescent salt, possessing a sharp saline taste. It is very *soluble* in water, and in alcohol. It may be made by double decomposition between ammonium bromide and milk of lime, or by the action of bromine upon milk of lime, in the presence of sulphur.

Action and Uses.—Used as a *sedative* to the nervous system. This salt is less depressing to the circulation than potassium bromide. It may be *prescribed* in sweetened aqueous solution, to be well diluted when administered.

Dose.—0.3 to 2 Gm.; 5 to 30 grains.

Lithii Bromidum (*Lithium Bromide*).—*Formula*, LiBr = 86.34. A white, granular salt; odorless and having a sharp, slightly bitter taste; very deliquescent; *soluble* in 0.6 part of water and very soluble in alcohol; also soluble in ether.

It may be prepared by acting upon lithium carbonate with hydrobromic acid.

Action and Uses.—Lithium bromide does differ materially in action from the alkali bromide, although containing a somewhat greater percentage of bromine (in combinations) than potassium bromide. It is used as a *sedative to the nervous system*. Being very deliquescent, it should *not* be *dispensed* in powders or tablets, but is suitable for *prescribing* in aqueous or alcoholic liquids.

Dose.—0.6 to 4 Gm.; 10 to 60 grains.

Potassii Bromidum (*Potassium Bromide*).—*Formula*, KBr = 118.22. Colorless, or white, cubical crystals, or a granular powder; odorless, and having a strongly saline taste. It is permanent in the air, *soluble* in about 1.5 parts of water, and in about 180 parts of alcohol; also soluble in glycerin. The salt may be made by double decomposition between potassium carbonate and ferrous bromide.

Action and Uses.—Potassium bromide is a distinct depressant to the brain, and spinal cord, and, like other bromides, is looked upon as a sedative of value in *nervous excitement, hysteria, insomnia, headache, tetanus, strychnine convulsions,* and many other functional and organic nervous maladies characterized by restlessness and convulsions. In full doses it is looked upon as a depressant to the circulation. "Bromism," a condition characterized by acne, coryza, and mental hebetude, develops if this or other alkali bromides are taken in repeated full doses, or if long continued.

The salt is *best prescribed* in aqueous solution or in compressed tablets.

Dose.—0.6 to 4 Gm.; 10 to 60 grains.

Sodii Bromidum (*Sodium Bromide*).—*Formula,* NaBr = 102.24. Colorless or white cubical crystals, or a white, granular powder; odorless, and having a saline, slightly bitter taste. The salt absorbs moisture from the air without deliquescing, is *soluble* in 1.7 parts of water, and in 12.5 parts of alcohol.

It may be made by double decomposition between potassium carbonate and ferrous bromide.

Action and Uses.—Sodium bromide is similar in action and uses to potassium bromide, except that it is less depressing to the circulation. It is best *administered* in solution or compressed tablets, as the powder absorbs moisture from the air and becomes moist.

Dose.—0.6 to 4 Gm.; 10 to 60 grains.

Strontii Bromidum (*Strontium Bromide*).—*Formula,* $SrBr_2 + 6\,H_2O$ = 352.94. Colorless, transparent, hexagonal crystals; odorless, and having a bitter saline taste. Very deliquescent. *Soluble* in 1 part of water, and readily soluble in alcohol.

Action and Uses.—The action of this salt in its effect upon the nervous system is similar to that of the alkali bromide, but it is less irritating to mucous membranes, less depressing to the circulation, and less likely to produce bromism. The salt should be *administered* in distilled water, to which a small quantity of diluted hydrobromic acid may be added.

Incompatibilities.—Strontium bromide is precipitated by soluble carbonates, salicylates, sulphates, phosphates, and benzoates, and by so many other substances that it should not, as a rule, be given in combination with other remedies.

Dose.—0.6 to 4 Gm.; 10 to 60 grains.

Zinc Bromidum (*Zinc Bromide*).—*Formula,* $ZnBr_2$ = 223.62. Zinc bromide is official as a white granular powder. It is very deliquescent, *soluble* in water and alcohol, is odorless, and has a sharp saline, metallic taste, and slightly acid reaction.

The salt may be made by acting upon zinc with bromine water, or by double decomposition between hot solutions of zinc sulphate and potassium bromide, and, after cooling, the addition of alcohol to separate potassium sulphate, and lastly evaporating to dryness and granulating.

Action and Uses.—Zinc bromide has the same sedative action as other bromides, but is more astringent and more irritating to mucous membranes than the alkali bromides. In excessive doses it is an irritant poison. Being deliquescent, it should *not* be *prescribed* in powders or compressed tablets.

Incompatibilities.—Zinc bromide is precipitated by fixed alkali hydroxides, lime water, soluble arsenates, soluble carbonates, soluble phosphates, soluble cyanides, sodium borate, and tannic acid.

Dose.—0.06 to 0.12 Gm.; 1 to 2 grains.

BROMOFORMUM—Bromoform

A liquid containing 99 per cent. by weight of absolute *Bromoform* ($CHBr_3$) and 1 per cent. of absolute alcohol. It should be kept in dark amber-colored, glass-stoppered bottles, in a cool place protected from light.

A transparent, colorless, mobile liquid, with an ethereal odor and a penetrating, sweet taste resembling that of chloroform. Its specific gravity is 2.808. It is *soluble* in all proportions of alcohol, ether, benzene, petroleum benzin, and in fixed and volatile oils, but is very sparingly soluble in water; it is highly volatile, but not inflammable. If 10 Cc. of bromoform be well shaken with 10 Cc. of distilled water, and the liquids upon standing be allowed to separate completely, the water removed from the layer of bromoform should be neutral to litmus paper (absence of free acid), and a portion should not produce a turbidity when treated with silver nitrate solution (absence of bromides and brominated compounds), and another portion treated with potassium iodide solution should not be tinted blue upon the addition of boiled starch (absence of free bromine).

Bromoform may be made by acting upon alcohol or acetone with bromine.

Action and Uses.—Bromoform is an antispasmodic of considerable power, and is administered in the treatment of *whooping cough*. In overdoses it is highly toxic, producing deep sleep and respiratory and circulatory depression. Several cases of poisoning have been placed on record, as a result of the drug being prescribed in water or aqueous liquids. It being insoluble in, but much heavier than, water, patients would receive the whole quantity in the last dose. It may be conveniently *administered* in aromatic elixir, a shake label being placed upon the bottle as a means of safety.

Dose.—0.06 to 0.3 Gm.; 1 to 5 minims.

BROMUM—Bromine

Symbol.—Br = 79.36.

A heavy, dark brownish-red, mobile liquid, evolving, even at ordinary temperatures, reddish fumes, highly irritating to the eyes and lungs,

and having a peculiar suffocating odor, resembling that of chlorine. It is *soluble* in 28 parts of water, and readily soluble in alcohol or ether; upon exposure to air or heat, it completely volatilizes without leaving any residue. It is obtained by acting upon the mother liquor of salt wells, containing bromides, with magnesium dioxide, potassium chlorate, or by electrolysis.

Action and Uses.—Bromine is powerfully caustic in its action, and is used to a very limited extent in medicine. It is applied by means of a glass rod to *ulcerating, sloughing,* and *gangrenous surfaces,* to destroy *unhealthy granulations.*

BUCHU.—Buchu

Family, Rutaceæ.

The dried leaves of *Barosma betulina,* a shrub growing in southern Africa, about $\frac{2}{3}$ inch (15 mm.) long, varying between oval and obovate, yellowish-green, apex obtuse, margin crenate or serrate, with a gland at the base of each tooth, the base more or less wedge-shaped; coriaceous, both surfaces beset with numerous slight projections; odor strong and characteristic; taste somewhat mint-like, pungent, and bitter. The leaves contain gum, resin, volatile oil, and a bitter glucoside known as *barosmin.*

Action and Uses.—The drug is a stimulant to the mucous membrane of the genito-urinary tract, and is *used* in the treatment of *pyelitis, subacute* and *chronic cystitis,* and *urethritis.*

Infusion of buchu is popular in domestic medicine in treating various disorders of the genito-urinary tract.

Dose.—1 to 2 Gm.; 15 to 30 grains in infusion.

Official Preparation

Fluidextractum Buchu (*Fluidextract of Buchu*).—Menstruum employed, 3 parts of Alcohol, 1 part of Water.

Dose.—1 to 2 Cc.; 15 to 30 minims.

CAFFEINA—Caffeine

Formula, $C_8H_{10}N_4O_2 + H_2O = 210.64$.

Caffeine is a feebly basic substance ($C_5H(CH_3)_3N_4O_2 + H_2O$), obtained from the dried leaves of *Thea,* and from *coffee,* and found also in other plants.

It is seen in white, flexible, silky, glistening needles, usually matted together in fleecy masses; permanent in air, and having a bitter taste. It is *soluble* in about 45 parts of water, and about 53 parts of alcohol. Its solubility in water is increased by the presence of certain sub-

stances, such as potassium bromide, sodium benzoate, and sodium salicylate.

Action and Uses.—In medicinal doses, caffeine is a stimulant to respiration and an excitant to the nervous system. While it probably does not directly stimulate the heart, enfeebled circulation is improved by the drug. In overdoses, caffeine gives rise to mental excitement, as shown by nervous irritability, insomnia, and sometimes delirium. The drug is *used* as an *antidote to opium*, a stimulant to respiration, and as a stimulant to the kidneys, in certain forms of chronic *Bright's disease*, and to relieve *headache* due to mental exhaustion.

Dose.—0.03 to 0.12 Gm.; ½ to 2 grains.

Official Preparations

Caffeina Citrata (*Citrated Caffeine*).—A white powder, having a slightly bitter, acid taste, and an acid reaction. Made by dissolving 50 Gm. of Citric Acid in hot Distilled Water, adding 50 Gm. of Caffeine, evaporating the resulting solution on a water bath to dryness, constantly stirring toward the end of the operation. Reduce the product to a fine powder and transfer it to well-stoppered bottles. One part of citrated caffeine forms a clear syrupy solution with about 4 parts of water. Upon dilution with 5 parts of water, a white crystalline precipitate (caffeine) separates, which redissolves when about 25 parts of water have been added.

Action and Uses.—Employed for the same purposes as caffeine.

Dose.—0.06 to 0.3 Gm.; 1 to 5 grains.

Caffeina Citrata Effervescens (*Effervescent Citrated Caffeine*).—A white, granular, effervescent salt, made from the following substances, having the action of and used for the same purpose as caffeine.

Composition.—Citrated Caffeine, 40 Gm.; Sodium Bicarbonate, 570 Gm.; Tartaric Acid, 300 Gm.; Citric Acid, 195 Gm.; to make 1000 Gm.

Dose.—2 to 8 Gm.; ½ to 2 ʒ.

CALAMUS—Calamus

Synonym, Sweet Flag. *Family*, Araceæ.

The unpeeled, dried rhizome of *Acornus calamus*, an herbaceous, perennial plant growing in marshy or swampy places throughout the north temperate zone. The official rhizomes are in pieces of from about ½ to 1 inch (12 to 25 mm.) thick, usually in longitudinally split pieces of various lengths; when entire, cylindraceous and somewhat vertically flattened; externally reddish-brown, somewhat annulate from remnants of leaf sheaths; upper surface with triangular leaf scars, the lower surface with circular-pitted scars of roots; odor aromatic; taste pungent and agreeably bitter. The rhizome contains a small percentage of

a pale yellow volatile oil, having the agreeable odor and sharp taste of calamus, and *acorin*, a glucoside.

Action and Uses.—The drug, and preparation of it, is used as a mild aromatic stimulant and tonic, and in the treatment of *flatulence* and *atonic dyspepsia*.

Dose.—0.3 to 1 Gm.; 5 to 15 grains or more.

Official Preparation

Fluidextractum Calami (*Fluidextract of Calamus*).—Menstruum, Alcohol, 3 parts; Water, 1 part.

Dose.—0.3 to 1 Cc.; 5 to 15 minims.

CALCIUM SALTS AND COMPOUNDS

Calcium in chemical combination exists abundantly in nature, chiefly as *carbonate* in marble, limestone, chalk, eggshells, and oyster shells; as *phosphate* in bones; as *sulphate* in gypsum and selenite. The official salts of calcium are mostly alkaline or neutral in reaction; those which are soluble salts in water are precipitated by soluble carbonates, phosphates, oxalates, and tartrates, and, when in concentrated solution, by soluble sulphates.

Official Preparations

Calcii Bromidum (*Calcium Bromide*). *Formula*, $CaBr_2 = 198.52$.—A white, granular salt, odorless, of a sharp saline taste, very deliquescent, neutral in reaction, *soluble* in 0.5 part of water, and in part of alcohol. It may be made by double decomposition between ammonium bromide and milk of lime, or by the action of bromine upon milk of lime in the presence of sulphur.

Action and Uses.—Calcium bromide is used as a sedative to the nervous system, it is less depressing to the circulation than potassium bromide.

It is best *prescribed* in an aqueous solution; being deliquescent, it should not be prescribed in powders or compressed tablets.

Incompatibilities.—Calcium bromide in solution is precipitated by soluble carbonates, phosphates, oxalates, and tartrates, and in concentrated solution by soluble sulphates.

Dose.—0.6 to 4 Gm.; 10 to 60 grains.

Calcii Carbonas Præcipitatus (*Precipitated Calcium Carbonate*). *Formula*, $CaCO_3 = 99.35$.—Precipitated calcium carbonate is a fine, white powder, without odor or taste, nearly insoluble in water, insoluble in alcohol, usually made by precipitation by adding a solution of sodium carbonate to a solution of calcium chloride.

Action and Uses.—Precipitated calcium carbonate as an antacid, and mildly astringent, useful for overcoming *gastric* and *intestinal acidity*, for controlling *diarrhœa*, as a dusting powder for intertrigo. Its chemical formula is the same as that of prepared chalk, but is in a finer powder. It may be *dispensed* in powders or in a mixture.

Dose.—0.6 to 2 Gm.; 10 to 30 grains.

Calcii Chloridum (*Calcium Chloride*). *Formula*, $CaCl_2 = 110.16$.—Calcium chloride rendered anhydrous by fusion at the lowest possible temperature. It may be manufactured by saturating hydrochloric acid with chalk or marble, evaporating to dryness and heating to redness.

White, slightly translucent, hard fragments, and very deliquescent; odorless, sharp saline taste, slightly neutral in reaction. It is *soluble* in 1.3 parts of water and in about 8 parts of alcohol. On account of its hygroscopic properties, it should be kept in glass-stoppered bottles.

Action and Uses.—Crystals or fragments of the drug applied to mucous membranes is escharotic in character, and even when well diluted is irritating to these membranes. It has been employed internally, with the idea of furnishing calcium where there is *insufficient bone formation*, in cases of *rickets*, and in similar conditions. It is also employed in the treatment of *glandular enlargements* of tubercular subjects, in *lupus*, and in *purpura*, *hemophilia*, and other hemorrhagic conditions. It increases the coagulability of the blood. Being deliquescent it should be *dispensed* in aqueous solution.

Incompatibilities.—Calcium chloride, like other soluble salts of calcium, is precipitated by soluble oxalates, carbonates, phosphates, and tartrates, and in concentrated solution by soluble sulphates.

Dose.—0.3 to 2 Gm.; 5 to 30 grains.

Calcii Hypophosphis (*Calcium Hypophosphite*). *Formula*, $Ca(PH_2O_2)_2 = 168.86$.—Colorless, transparent, monoclinic prisms, or lustrous scales, or a white, crystalline powder, odorless, having a nauseous and bitter taste; permanent in air; *soluble* in 6.5 parts of water and 6 parts of boiling water; insoluble in alcohol. Caution should be observed when triturating calcium hypophosphite, as an explosion is liable to occur when it is triturated or heated with nitrates, chlorates, sugar, or other oxidizing agents. It is made by boiling together phosphorus and milk of lime.

Action and Uses.—Like other hypophosphites, this salt is supposed to have the properties of stimulating or regenerating nervous matter, and other tissues containing phosphorus, and is *used* in the treatment of *rickets*, *osteomalacia*, *dental caries*, *ununited fractures*, in *tubercular subjects*, and in *tuberculosis of the lungs*. It is probably not absorbed into the blood as calcium hypophosphite, but is changed in the stomach to calcium phosphate and absorbed as calcium lactophosphate. It enters into the composition of a number of pharmaceutical preparations, the most important being the Syrup of Hypophosphites, Compound Syrup

of Hypophosphites, and the Emulsion of Cod-liver Oil with Hypophosphites.

Incompatibilities.—If forms an explosive when triturated or heated with nitrates, chlorates, sugar, potassium permanganate, and other oxidizing substances, and is precipitated from solution by the fixed alkali hydrates, soluble sulphates, carbonates, oxalates, and tartrates.

Dose.—0.3 to 0.6 Gm.; 5 to 10 grains.

Calcii Phosphas Præcipitatus (*Precipitated Calcium Phosphate*). *Formula,* $Ca_3(PO_4)_2$ = 307.98.—A bulky, white, amorphous powder, odorless and tasteless, permanent in air. It is almost *insoluble* in cold water, partly decomposed by boiling water, which dissolves out the acid salt; almost insoluble in acetic acid, except when freshly precipitated; easily soluble in hydrochloric or nitric acid; insoluble in alcohol. It is prepared by dissolving bone ash in hydrochloric acid and precipitated by the addition of water and ammonia.

Action and Uses.—The remedy is employed *internally* as a feeble antacid, and also to supply bone salt in cases of *rickets, dental caries, ununited fractures,* and in similar conditions; *locally,* it may be employed as a dusting powder, in *intertrigo* and *excessive sweating.* On account of its insolubility in water it was formerly employed extensively in the manufacture of many of the official waters, but in the present pharmacopœia it has been replaced by purified talc. It is one of the ingredients entering into the preparation of the Syrup of Calcium Lactophosphate. The salt being insoluble in alcohol or water, is best *prescribed* in powders, capsules, or cachets.

Dose.—0.6 to 2 Gm.; 10 to 30 grains.

Calcii Sulphas Exsiccatus (*Exsiccated Calcium Sulphate, Plaster of Paris*). *Synonyms,* Gypsum; Plaster of Paris. *Formula,* $CaSO_4$.—A fine, white powder, without odor or taste, prepared from the purer varieties of native gypsum, $(CaSO_4 + 2H_2O)_2$, by carefully heating until three-fourths of the water has been expelled. It should be kept in well-closed vessels, protected from moist atmosphere, from which it attracts moisture and becomes granular, and then loses its properties of hardening in water. When mixed with half its weight of water, exsiccated calcium sulphate forms a smooth, cohesive paste, which rapidly hardens.

Action and Uses.—Plaster of Paris is never administered internally, but on account of the rapidity with which it fixes when mixed with water, it is used in applying *rigid dressing* for fractures or other conditions when members or parts of the body are to be rendered immovable. In pharmacy, it is employed in making sulphurated lime. When used for fixed dressings, the gypsum may be mixed with two parts of water, with which it forms a soft paste, which, when applied over bandages or other dressings, hardens in about fifteen or twenty minutes. Plaster of Paris bandages may be made by spreading the exsiccated calcium sulphate upon unrolled strips of cheese cloth or flannel, rolling into

a bandage, which are applied by first soaking them in a basin of water to which a small quantity of salt has been added, squeezing out a part of the water, and binding about the limb or part previously covered by soft dressings. They become hard after fifteen or twenty minutes. The paste is also employed for taking *casts* of different parts of the body.

CALX—Lime, Calcium Oxide

Formula, CaO = 55.68.

Hard, white, or grayish-white masses, which, in contact with air, gradually attract moisture and carbon dioxide and fall to powder. It is prepared by calcining white marble, or the purest varieties of native calcium carbonate (lime, stone, and chalk). It is *soluble* in 760 parts of cold water, in 1600 parts of boiling water, and insoluble in alcohol. Sugar and glycerin increase its solubility in water. It is dissolved by acids, with the exception of sulphuric acid, with which it forms insoluble calcium sulphate, as does sulphuric acid with all salts and preparations of calcium. When sprinkled with about half its weight of water, calcium oxide becomes heated, and is gradually converted into white powder (calcium hydroxide, or slaked lime); which when mixed with about three or four parts of water forms a smooth magma (milk of lime). It has an alkaline reaction, and a caustic burning taste.

Action and Uses.—Weak solutions of lime, being alkaline, are used as antacids, whereas in concentrated form, in the presence of moisture, it is an escharotic. It arrests putrefaction, and is used as a disinfectant for cesspools and for similar purposes. Like other salts of calcium, lime water and syrup of lime are employed as *antacids,* and also to furnish bone salts to the tissues in diseased conditions in which the bone salts are deficient. Lime water is frequently added to cow's milk to lessen its acidity, so as to *prevent curdling* and assist in its more ready *digestion.* Syrup of lime is an astringent and active antacid, useful for internal administration when a strong solution of lime is desired. A mixture of lime water and linseed oil, under the name of Carron Oil, is a popular remedy used for treating *burns.* Lime (not lime water) in overdoses gives rise to gastro-intestinal inflammation, which is treated by the administration of weak acid, such as vinegar, orange juice, or lemon juice, to neutralize the lime, to be followed by milk, sweet oil, and mucilage of acacia to soothe the mucous membrane.

Incompatibilities.—Being a salt of calcium, it is precipitated from solution by soluble sulphates, soluble carbonates, phosphates, oxalates, and tartrates. It is also incompatible with acids, the metallic salts, and hydrated chloral, as are all hydroxides and fixed alkalies.

Official Preparations

Liquor Calcis (*Lime Water, Solution of Calcium Hydroxide*).—A saturated solution of Calcium Hydroxide in water, containing about

0.17 per cent. of Calcium Hydroxide. Made by adding lime to distilled water.

Dose.—4 to 16 Cc.; 1 to 4 f℥.

Syrupus Calcis (*Syrup of Calcium Hydroxide, Syrup of Lime*).—A strongly alkaline syrup, made by dissolving lime in sugar and water. The strength of the preparation is somewhat uncertain, but, when freshly made, it contains about 3 per cent. of calcium oxide, 20 minims being equal to about a fluidounce of lime water. Used as an active antacid and mild astringent.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

Linimentum Calcis (*Lime Liniment*). *Synonym,* Carron Oil.—Made by shaking together equal parts of lime water and linseed oil. *Used* as a local application for *burns.*

Calx Chlorinata (*Chlorinated Lime, Chlorinated Calcium Oxide*). *Synonym,* Bleaching Powder.—Chlorinated lime is not a definite chemical salt, but a compound, resulting from the action of chlorine upon calcium hydroxide. It is often improperly called chloride of lime. It should contain not less than 30 per cent. of available chlorine. As it liberates its chlorine upon exposure, it should be kept in well-closed vessels in a cool and dark place. Chlorinated lime is a grayish-white, granular powder, exhaling the odor of hypochlorous acid, has a repulsive saline taste, and becomes moist and gradually decomposes upon exposure to air. It is only *partially soluble* in water or alcohol. Aqueous solutions of it first color litmus paper blue, and then bleach it. The compound is rapidly decomposed, with the liberation of chlorine, by adding to it hydrochloric, sulphuric, or acetic acid.

Action and Uses.—The value of this compound as a disinfectant and *bleaching* agent is dependent upon the large quantity of chlorine, which may be liberated from it. It is available as a carrier of chlorine in the same way that the sponge is available for carrying water. Aside from its value as a compound from which large quantities of chlorine may be liberated, it has the property of absorbing moisture and acts as a desiccant, and thereby prohibits the growth of microbes. As a disinfectant it is valuable for disinfecting the urine, stools, and sputum of patients suffering from infectious diseases. It is a very popular compound for disinfecting sewers, cesspools, and foul-smelling diseased foci. A 1 per cent. aqueous mixture is sometimes used as a mouth wash in *ulcerated stomatitis,* and as a *gargle* in the treatment of *putrid sore throat.* It is rarely administered internally in *fermentative diseases* of the stomach and intestines. *Locally,* it is an irritant to the skin and mucous membranes, and in overdoses causes gastro-enteritis.

Dose.—0.12 to 0.3 Gm.; 2 to 5 grains.

Calx Sulphurata (*Sulphurated Lime*). *Synonym,* Crude Calcium Sulphide.—Sulphurated lime is not a definite chemical salt, but a mixture containing at least 60 per cent. of calcium sulphide (CaS), together with unchanged calcium sulphate ($CaSO_4$) and carbon in varying

proportions. It is made by mixing together dried calcium sulphate, charcoal, starch, placing lightly in a crucible covered loosely and heated to bright redness until the contents lose their black color. After allowing the crucible to cool, the contents are reduced to powder by trituration and transferred to small glass-stoppered vials.

It is a pale gray powder, exhaling a faint odor of hydrogen sulphide, having a nauseous and alkaline taste, and gradually decomposing upon exposure to moist air. It is *insoluble* in alcohol; very sparingly *soluble* in cold water, but more readily *soluble* in boiling water, which partially decomposes it with the liberation of hydrogen sulphide.

Action and Uses.—Sulphurated lime in the presence of moisture is, when locally applied, an escharotic. A strong aqueous solution may be made use of as a local application for the removal of *superfluous hair*. Internally it is employed in the treatment of *boils* and *acne pustulosa*.

Dose.—0.03 to 0.06 Gm.; ½ to 1 grain.

CRETA PRÆPARATA—Prepared Chalk

Formula, $CaCO_3$ = 99.35.

Prepared chalk is native calcium carbonate freed from most of its impurities by elutriation. It is seen as a heavy, white or grayish-white, very fine, amorphous powder, often moulded into conical masses, free from odor, tasteless, almost wholly *insoluble* in water and insoluble in alcohol. Although of the same chemical composition as precipitated calcium carbonate, prepared chalk is not so white, nor so bulky as the precipitated carbonate; furthermore, it adheres well to the skin and mucous membranes.

Action and Uses.—Prepared chalk is antacid, and a mild astringent. It is employed to overcome *gastric* or *intestinal acidity*, to check *serous diarrhœa*, being usually prescribed in the form of chalk mixture, an old and highly prized remedy for *diarrhœa of babies*. It furnishes a valuable *antidote to acids*. Locally, prepared chalk is used as a dusting powder. It enters into the composition of Compound Chalk Powder, Chalk Mixture, Mercury with Chalk, and many cosmetics.

Incompatibilities.—Prepared chalk is incompatible with acids.

Dose.—0.6 to 2 Gm.; 10 to 30 grains.

Official Preparations

Pulvis Cretæ Compositus (*Compound Chalk Powder*).

Composition.—Prepared chalk, 30 Gm.; Acacia, 20 Gm.; Sugar, 50 Gm. This powder furnishes a convenient and agreeable means of administering chalk, and lends itself readily to combinations for powders or mixtures. It is used in making the official Chalk Mixture.

Dose.—2 to 8 Gm.; ½ to 2 ʒ.

Mistura Cretæ (*Chalk Mixture*).—This popular remedy, so extensively employed in the treatment of *diarrhœa*, quickly undergoes fermenta-

tion during warm weather, and should be freshly prepared when needed. It is prepared readily by rubbing 20 Gm. of Compound Chalk Powder with 40 Cc. of Cinnamon Water and adding enough Water to make 100 Cc.; each ounce contains about 1½ drams of compound chalk powder.

Dose.—4 to 16 Cc.; 1 to 4 ʒ.

CALENDULA—Calendula

Synonym, Marigold. *Family,* Compositæ.

The dried ligulate florets of *Calendula officinalis,* from an annual plant, native to southern Europe, and extensively cultivated as an ornamental flower in north temperate zones. The florets are from $\frac{2}{5}$ to 1 inch (15 to 25 mm.) long, yellow or orange-colored, one to three toothed, with a short hairy tube occasionally enclosing the remnants of a filiform style and bifid stigma; odor slight and somewhat heavy; taste slightly bitter, and faintly saline. It contains a volatile oil, and an amorphous bitter principle.

Action and Uses.—The drug is almost devoid of active physiological properties, but is popular in domestic medicine as a *tonic, febrifuge,* and *diuretic* The florets are used in the form of *poultices* for the purpose of applying external heat and moisture, and the tincture as a local application for *sprains, bruises,* and similar conditions.

Dose.—1 to 2 Gm.; 15 to 30 grains.

Official Preparation

Tinctura Calendulæ (*Tincture of Calendula*).—Calendula, 20 Gm.; alcohol to make 100 Cc. of tincture. Used locally for *bruises, sprains,* etc.

CALUMBA—Calumba (Colombo)

Synonym, Colombo. *Family,* Menispermaceæ.

The dried root of *Jateorhiza palmata,* a climbing plant growing in southern Africa.

The root comes into commerce in transverse, circular, or oval biconcave sections, 1 to 2 inches (25 to 50 mm.) in diameter, and $\frac{1}{12}$ to ½ inch (2 to 12 mm.) thick; externally greenish-brown and roughly wrinkled; internally, yellowish or grayish-yellow, with a few interrupted circles of fibrovascular bundles, distinctly radiate in the outer portion, with a dark cambium; taste slightly aromatic, intensely bitter; it contains *berberine* and *calumbin.* Unlike all other bicter tonics, except quassia, it does not contain any tannin or tannic acid.

Action and Uses.—Calumba, like other simple bitter tonics, stimulates the functional activity of the gastro-intestinal mucous membrane, and is employed as a bitter tonic in *atonic dyspepsia, loss of appetite,*

and *morning vomiting of alcoholic subjects*. As it does not contain tannic acid, the preparations of it, if desired, may be given in combination with the tincture of ferric chloride, or other preparations of iron.

Official Preparations

Fluidextractum Calumbæ (*Fluidextract of Calumba*).—Made by maceration and percolation with a menstruum of Alcohol, 7 parts, and Water, 3 parts.

Dose.—1 to 4 Cc.; 15 to 60 minims.

Tinctura Calumbæ (*Tincture of Calumba*).—Made by percolating 20 Gm. of Calumba with a menstruum of 3 parts of Alcohol and 2 parts of Water to make 100 Cc.

Dose.—2 to 8 Cc.; ½ to 2 f℥.

CAMBOGIA—Gamboge

Family, Guttiferæ.

A gum-resin obtained from *Garcinia hanburrii*, a small tree growing in India, principally in the provinces of Siam and Gambogia.

To obtain gamboge, a deep incision through the bark of the trunk of the tree is made, from which a milky juice exudes, which is collected and transferred to hollow bamboo joints, in which it is permitted to dry. In drying it contracts toward the sides, leaving a cylindrical cavity running through the pieces, which after the removal of the bamboo give the dried gum-resin the appearance of a large, thick pipe-stem; this is known as pipe bamboo. It is seen in cylindrical, orange-brown pieces, usually hollow at the centre, ⅘ to 2 inches (2 to 5 cm.) thick, longitudinally striate upon the surface; fracture conchoidal, smooth, of a waxy luster, orange red; inodorous; taste very acrid. The powder is bright yellow, sternutatory, practically free from starch. Gamboge should yield not less than 75 per cent. of alcohol-soluble matter, and not more than 5 per cent. of ash. As some of the gamboge in the market is adulterated with wheat, rice, flour, starch, sand, and woody fiber, all of which are insoluble in alcohol, and give a larger per cent. of ash when incinerated, the above test as to purity has been recommended.

Action and Uses.—Gamboge is a gastro-intestinal irritant; it is used in combination with other drugs as a *hydragogue cathartic*. If given alone in a purgative dose, it produces griping pains. In overdoses it gives rise to gastro-enteritis, 60 grains having proved fatal. The drug is one of the ingredients of Compound Cathartic Pills.

CAMPHORA—Camphor

Formula, $C_{10}H_{16}O$ = 150.98. *Family,* Lauraceæ.

The dextrogyrate modification of the saturated ketone ($C_9H_{16}CO$) obtained from *Cinnamomum Camphora* and purified by sublimation. The production of camphor is carried on extensively in China, Japan, and Formosa, in eastern Africa, and the adjacent islands. The camphor tree, which is a handsome evergreen, becoming about five years old, is cut down and the wood of the roots and the trunk to the height of about eight feet is cut into chips, which are distilled, and the camphor which collects upon the walls of the chamber is drained of its oil and pressed into barrels or boxes as crude camphor. This crude product is usually refined and pressed into blocks of suitable sizes and then placed on the market.

Official camphor is a white, translucent mass, of a tough consistence and crystalline structure; readily pulverizable in the presence of a little alcohol, ether, or chloroform; having a penetrating, characteristic odor, and a pungent, aromatic taste. It is *sparingly soluble* in water, but *readily soluble* in alcohol, ether, chloroform, and in fixed and volatile oils. When camphor is triturated in about molecular proportions with menthol, thymol, phenol, or hydrated chloral, liquefaction ensues. It melts at about 175° C. (347° F.), and is highly inflammable, burning with a luminous, smoky flame. Upon exposure to the air, it volatilizes more or less rapidly, and should, therefore, be kept in well-closed vessels in a cool place. When moderately heated, it sublimes without leaving a residue. Solutions of camphor in alcohol, ether, or chloroform are precipitated or rendered cloudy by the addition of water.

Action and Uses.—Applied *locally* to the epidermis in concentrated solution, camphor acts as a stimulant and mild irritant, and is a stimulant or irritant to mucous membranes according to the concentration of the solution employed. In the mouth it produces the agreeable burning sensation of the aromatics; if swallowed in large quantities it gives rise to a burning pain in the œsophagus, stomach, and abdomen, followed by vomiting. Camphor is a valuable, diffusible stimulant, increasing the force and frequency of the pulse, a respiratory stimulant, a nervous sedative, and an antispasmodic. *Internally,* it is used as a sedative in *functional nervous disorders,* as a carminative for the relief of intestinal *flatulence* in the treatment of *diarrhœa, cholera,* and *cholera morbus,* as a powerful diffusible stimulant to prevent depression in the later stages of *adynamic fevers,* in *shock, bronchitis,* and in *acute coryza. Externally,* it is employed as a counterirritant in *headache, neuralgia, muscular rheumatism, sprains,* and other conditions calling for mild continuous counterirritation. Camphor and phenol mixed in a proportion of about three parts of the former and one part of the latter form a liquid which is highly valued by many as a local application to abort *boils* and *disinfect small abrasions.* Cam-

phor and thymol, or camphor and menthol liquefied by trituration and made into an ointment with ointment of rose water, furnishes an agreeable counterirritant and local anesthetic, which is valuable in the treatment of *neuralgia* and *inflamed joints*.

Poisoning.—In poisonous quantities, camphor produces a burning pain in the mouth, œsophagus, stomach, and abdomen; vertigo, roaring in the ears, delirium, and in some cases of epileptiform convulsions; the pulse becomes weaker and rapid, the skin cold and covered with sweat.

Incompatibilities.—Camphor is liquefied when triturated dry with about equal parts of any one of the following substances: Hydrated chloral, phenol, menthol, thymol, resorcinol, phenyl salicylate, ethyl carbamate, chloral acetic acid, and butyl chloral hydrate. Although camphor is soluble to a very slight degree in water, it is freely soluble in alcohol, and one of the most frequent incompatibilities observed are prescriptions calling for mixtures containing alcoholic solutions of camphor and water, in such proportions that the camphor is thrown out of solution, which, being of less specific gravity than water, floats to the top of the mixture.

Dose.—0.6 to 0.2 Gm.; 1 to 3 grains.

Official Preparations

Camphor enters into the composition of Camphorated Tincture of Opium, Soap Liniment, Compound Morphine Powder, Liniment of Belladonna, and also the following official preparations of it.

Aqua Camphora (*Camphor Water*).—An 0.8 per cent. aqueous solution of camphor made by dissolving Camphor in Alcohol, triturating with Pulverized Talc with Distilled Water, and filtering.

Dose.—4 to 16 Cc.; 1 to 4 f℥.

Ceratum Camphoræ (*Camphor Cerate*).—Containing about 2 per cent. of Camphor, made by mixing together Camphor Liniment, White Wax, White Petroleum, and Benzoinated Lard.

Linimentum Camphoræ (*Camphor Liniment*). *Synonym*, Camphorated Oil.—A 20 per cent. solution of Camphor in Cotton-seed Oil. Used externally.

Spiritus Camphoræ (*Spirit of Camphor*).—A 10 per cent. solution of Camphor in Alcohol. Used locally and internally.

Dose.—0.6 to 2 Gm.; 10 to 30 minims.

Acidum Camphoricum (*Camphoric Acid*). *Formula*, $H_2C_{10}H_{14}O_4$ = 198.62.—A colorless, odorless, crystalline, non-irritating, dibasic acid, obtained by oxidizing camphor with hot nitric acid. It is *soluble* in 125 parts of cold water and freely soluble in alcohol.

Action and Uses.—Camphoric acid checks secretions from the skin, and is employed to prevent the *night sweats of phthisis*. It is best *prescribed* in powders, to be taken in a little wine about two hours before the expected sweat.

Dose.—1 to 2 Gm.; 15 to 30 grains.

Camphora Monobromata (*Monobromated Camphor*). *Formula*, $C_{10}H_{15}BrO$ = 229.34.—Colorless, prismatic needles or scales, having a mild but characteristic camphoraceous odor and taste, permanent in air, unaffected by light, and neutral to litmus paper. Almost *insoluble* in water, freely *soluble* in alcohol, ether, and fixed and volatile oils. It is made by acting upon camphor with bromine.

Action and Uses.—Monobromated camphor has the combined sedative effect upon the nervous system of the bromides and of camphor; furthermore, like camphor it is stimulating to circulation. It is *used* to allay *nervous irritation, insomnia,* for the relief of *headache,* and for other purposes for which the bromides are valuable. It is best *administered* in tablets or capsules.

Incompatibilities.—When triturated with phenol, hydrated chloral, phenyl salicylate, or thymol, it either liquefies or forms a soft mass.

Dose.—0.12 to 0.2 Gm.; 2 to 3 grains.

CANNABIS INDICA—Indian Cannabis

Synonym, Indian Hemp. *Family,* Moraceæ.

The dried flowering tops of the pistillate plants of *Cannabis sativa*, grown in the East Indies, gathered while the fruits are yet undeveloped, and carrying the whole of their natural resin.

The drug is seen in dark green or more or less brownish compressed masses, consisting of densely paniculate branchlets, about 2 inches (5 cm.) or more in length, and the inflorescence more or less agglutinated with a resinous exudation; commonly with a few undeveloped digitate leaves of one or more linear-lanceolate leaflets; clothed with numerous sheathing pointed bracts, each containing two small mature but unfertilized pistillate flowers; odor agreeably narcotic; taste characteristic. In the powder, few or no pollen grains or stone cells should be present. Indian hemp contains a large quantity of greenish *resin*, which is freely soluble in alcohol, and is precipitated from the alcoholic preparations of the drug when water is added to it. The effects obtained from the use of cannabis indica varies greatly, this being due to any one of a number of causes. In the first place, the drug may be robbed of its resin before it is placed in the market; in the second place, it deteriorates rather rapidly, and, therefore, the preparations should be made only from recently collected tops of the female flower carrying the whole of its resin; lastly, it is a well-known fact that its apistillate or male flowers do not possess the medicinal properties of the pistillate, or female flowering tops, and if its official preparations should not be prepared from specimens of Cannabis Indica containing a large percentage of the admixture of the male and female tops, the preparations would not possess the full action of that prepared from the official variety.

Action and Uses.—In medicinal doses, cannabis indica is a sedative to the nervous system and is employed in the treatment of *migraine, neuralgic headache,* for the relief of *pelvic neuralgia,* and for the purpose of quieting *irritative cough.* Aside from the variable strength of the preparations, many persons possess peculiar idiosyncrasies to the drug, so that even in small doses they are thrown into a state of intoxication and mental excitement. In overdoses or in susceptible individuals the drug is an intoxicant, gives rise to hallucinations, followed by stupor and deep sleep. When giving cannabis indica for the first time, only the smallest doses should be used.

Official Preparations

Extractum Cannabis Indicæ (*Extract of Indian Cannabis*).—An extract of a pilular consistency.

Dose.—0.004 to 0.03 Gm.; $\frac{1}{16}$ to $\frac{1}{2}$ grain.

Fluidextractum Cannabis Indicæ (*Fluidextract of Indian Cannabis*).—Made with a menstruum of alcohol. Readily precipitated when mixed with water. Best *prescribed* to be taken in drops or sugar, in an emulsion, or in alcohol.

Dose.—0.06 to 0.2 Cc.; 1 to 3 minims.

Tinctura Cannabis Indicæ (*Tincture of Indian Cannabis*).—Made by percolating 10 Gm. of Cannabis Indica with Alcohol to make 100 Cc. of tincture. Readily precipitates its resin when added to water or aqueous liquids. Best *prescribed* to be taken in drops, or in an emulsion.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

CANTHARIS—Cantharides

Synonym, Spanish Flies.

The beetle, *Cantharis vesicatoria,* thoroughly dried at a temperature not exceeding 40° C. (104° F.).

The beetles are collected chiefly in Hungary and southern Russia. In the early morning hours of July the herbs and trees, such as the ash, lilac, elder, and honeysuckle, upon which the insects collect, are shaken or beaten, and the insects gathered up from cloths or sheets spread under the tree, and placed in vessels which are capable of being tightly closed, and are killed by means of chloroform, ether, oil of turpentine, or carbon disulphide.

The beetle is from $\frac{3}{4}$ to 1 inch (18 to 25 mm.) long, about $\frac{1}{4}$ inch (6 mm.) broad; flattish cylindrical, with filiform antennæ; black in the upper part, with two long wing sheaths, and ample membranous, transparent, brownish wings; elsewhere of a shining coppery-green color; odor strong and disagreeable; taste slight, afterward acrid.

The powder is grayish brown, with shining green particles, and contains few or no hairs; ash, not more than 8 per cent. All parts of the insects contain an active crystalline principle, known as *cantharidin.*

Action and Uses.—Cantharides is an active irritant to all tissues and organs of the body, and when applied in concentrated form to the epidermis produces blisters. In small doses, it is an irritant to the kidneys and genito-urinary tracts throughout. If swallowed in overdoses, it produces burning in the throat, stomach, and bowels, followed by nausea, vomiting, and purging, pain in the loins, inflammation of the kidneys accompanied by bloody urine, and painful urination on account of the inflammation of the bladder and urethra. *Internally*, in small doses, the tincture is used as a diuretic in *chronic inflammation of the kidneys*. Locally, the cerate and collodion are employed for blistering the skin; they should be applied only in small quantities, as absorption from the skin may take place and give rise to acute inflammation of the kidneys.

Official Preparations

Ceratum Cantharidis (*Cantharides Cerate*).—Made by mixing 32 Gm. of powdered Cantharides, setting aside for forty-eight hours, and then thoroughly mixing with 18 Gm. of Yellow Wax, 18 Gm. of Rosin, and 17 Gm. of Lard, previously melted and strained through muslin, and keeping the mixture in a liquid condition by means of a water-bath, stirring occasionally for an hour, then stirring until it congeals.

Used externally as a blistering agent by spreading upon suitable material and applying to the skin.

Collodium Cantharidatum (*Cantharidal Collodion*).—Made by exhausting powdered cantharides by percolating it with chloroform, partially evaporating, adding the evaporated residue to flexible collodion, and after it has thoroughly settled, pouring off the clear portion from any sediment which may have formed, and transferring it to bottles.

Used locally as a blistering agent.

Tinctura Cantharidis (*Tincture of Cantharides*).—Made by percolating 10 Gm. of powdered Cantharides with Alcohol to make 100 Cc. of tincture.

Dose.—0.06 to 0.6 Cc.; 1 to 10 minims.

CAPSICUM—Capsicum

Synonym, Cayenne Pepper. *Family*, Solanaceæ.

The dried ripe fruit of *Capsicum fastigiatum* deprived of its calyx. It is widely cultivated in foreign countries, that from which the official capsicum is obtained being cultivated in tropical countries, chiefly obtained from India and Africa. Capsicum contains *capsaicin*, a volatile alkaloid, a volatile oil, and resin.

Action and Uses.—Locally, capsicum is an active rubefacient to the skin and a vesicant to the mucous membranes. In medicinal doses

it is a stimulant to the mucous membranes, and is *used* to increase the appetite, particularly in *atonic dyspepsia*. The drug is more extensively used, however, as a *local counterirritant*. When applied to the skin it gives rise to burning sensation, with considerable redness, but, unlike mustard, it neither produces vesication nor pigmentation of the skin.

Dose.—0.06 to 0.3 Gm.; 1 to 5 grains.

Official Preparations

Emplastrum Capsici (*Capsicum Plaster*).—Made by applying a thin layer of Oleoresin of Capsicum spread upon Adhesive Plaster.

Used externally as a counterirritant.

Fluidextractum Capsici (*Fluidextract of Capsicum*).

Menstruum, alcohol.

Dose.—0.06 to 2 Cc.; 1 to 30 minims.

Oleoresina Capsici (*Oleoresin of Capsicum*).—Made by exhausting Capsicum by percolating it with Acetone and then evaporating to obtain the semiliquid oleoresin.

Dose.—0.016 to 0.06 Cc.; ¼ to 1 minim.

Tinctura Capsici (*Tincture of Capsicum*).—Made by percolating 10 Gm. of Capsicum with a menstruum of Alcohol 9.5 parts, and Water 5 parts to make 100 Cc. of tincture.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

CARBONEI DISULPHIDUM—Carbon Disulphide

Formula, $CS_2 = 75.75$.

A clear, colorless, highly refractive and highly volatile liquid, having a strong, characteristic odor, prepared by passing the vapor of burning sulphur over charcoal or coke heated to redness, condensing the vapor and rectifying it by treating with chlorinated lime, and then repeated over litharge, mercury, mercuric chloride, anhydrous cupric sulphate, or pure fatty oils. Carbon disulphide is sparingly soluble in water, but freely *soluble* in alcohol, chloroform, and oils. It is highly inflammable, and when ignited burns with a blue, luminous flame, producing carbon dioxide and sulphur dioxide. Impure carbon disulphide has a most disagreeable fetid odor, which is due to the presence of other volatile compounds. It is a solvent for phosphorus, sulphur, bromine, fats, volatile oils, and caoutchouc, and is extensively used in the arts.

Action and Uses.—Internally, in small doses (from 2 to 5 drops) it produces nausea, vomiting, a sense of heat in the stomach, and a weak, rapid action of the heart. These disagreeable features prevent it from being used externally to an extent. Locally, on account of its high volatility it may be used as a spray to produce *local anesthesia*, but on account of its disagreeable odor is rarely employed. Persons exposed

to its fumes suffer from headache, vertigo, nervous excitement, incoordination of movements, and after long exposure become emaciated and anemic. The liquid is used as a solvent in preparing Charta Sinapis. The vapor, being highly inflammable, should not be brought near a flame or open fire; a lighted cigar in the presence of the vapor has caused explosions and accidents.

CARBO LIGNI—Charcoal

Charcoal prepared from soft wood and very finely powdered.

That most highly prized is made from young shoots of the willow, poplar, or linden. It has the property of absorbing gases, which makes it of value as a deodorizer.

Action and Uses.—The property of charcoal to absorb gases and oxidized putrefactive organic matter makes it of value as a deodorant. *Locally,* poultices of charcoal are employed in the treatment of *foul ulcers. Internally,* it is used in the treatment of *fermentative dyspepsia* with eructations, in *fermentative diarrhœa,* and some forms of *constipation.* While tablets and lozenges of wood charcoal are convenient for administration, it is more prompt and effective in its action when *administered* in powdered form.

Dose.—0.3 to 1 Gm.; 5 to 15 grains.

CARBO ANIMALIS—Animal Charcoal. CARBO ANIMALIS PURIFICATUS—Purified Animal Charcoal

Animal charcoal (*Carbo Animalis*), prepared from bone, and purified animal charcoal (*Carbo Animalis Purificatus*) is official, but not employed either locally or internally.

All forms of charcoal are valuable as decolorizers and deodorizers, and are frequently employed to remove tannin, alkaloids, bitter principles, metallic salts, iodine, lime, and coloring matter from aqueous liquids. Odorous principles may be removed both from alcoholic and aqueous liquids by filtering them through charcoal; its well-known action in removing fusel oil from spirits being a familiar example.

CARDAMOMUM—Cardamom

Family, Zingiberaceæ.

The dried nearly ripe fruit of *Elettaria repens,* a perennial red-like herb, growing in India, Malabar, and other tropical regions. The plant begins to yield the fruit in the fourth year of its growth, and continues for a number of years thereafter. The fruit, which is official, is usually gathered in the beginning of October. It grows upon recumbent scapes or root stems, is gathered just before it has fully matured, and dried by sunning or by fire.

It is oblong-ovoid, obtusely triangular in transverse section, from ½ to 1 inch (12 to 25 mm.) long, slightly beaked at the apex, rounded to truncate at the base; three-celled and with central placentæ; pericarp thin leathery, nearly tasteless, and of a pale yellow color; seeds, 15 to 18 in number, about ⅕ inch (5 mm.) long, oblong-ovoid and irregularly angular, reddish-brown, enclosed in a thin, membranous aril; odor and taste strongly and agreeably aromatic. The seeds contain an aromatic and agreeable volatile oil, to which the drug owes its medicinal properties.

Action and Uses.—Cardamon is a carminative, stomachic stimulant and aromatic. All the official preparations of it are used as vehicles or excipients for other more potent remedies. The compound tincture of cardamom contains cardamom, saigon cinnamon, caraway, cochineal, glycerin, and diluted alcohol. On account of its agreeable odor and taste, and its pleasing red color, it is extensively employed in other mixtures to give them an agreeable taste, odor, and color.

Official Preparations

Pulvis Aromaticus (*Aromatic Powder*).—Made by thoroughly triturating together powdered Saigon Cinnamon, Ginger, Cardamom, and Nutmeg. *Used* as a stomachic, when moistened with alcohol as a mild counterirritant, and for preparing Aromatic Fluidextract.

Dose.—0.3 to 1 Gm.; 5 to 15 grains.

Tinctura Cardamomi (*Tincture of Cardamom*).—Made by percolating 20 Gm. of Powdered Cardamom with Diluted Alcohol to make 100 Cc. of tincture.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Tinctura Cardamomi Composita (*Compound Tincture of Cardamom*). —Made by macerating 25 Gm. of Cardamom, 25 Gm. of Saigon Cinnamon, 12 Gm. of Caraway, and 5 Gm. of Cochineal with 750 Cc. of a menstruum of Alcohol 950 Cc. and 50 Cc. of Glycerin for seven days, filtering and then pouring through the residue the remainder of the above-named menstruum, and then enough alcohol to make 1000 Cc. of tincture. *Used* as a *stomachic* and *carminative*, but chiefly of value to give an agreeable taste and pleasing color to many liquid prescriptions.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

CARUM—Caraway

Synonym, Caraway Seed. *Family*, Umbelliferæ.

The dried fruit of *Carum carvi*, a biennial plant, indigenous to the western Himalayas, Caucasus, and cultivated in Norway, Russia, Germany, Holland, England, Morocco, and the United States.

The fruit is about ⅛ inch (4 to 5 mm.) long, oblong, laterally compressed, usually separated into the two mericarps, which are curved,

tapering toward each end, dark brown, with five yellowish, filiform ribs, and with six oil tubes; seed plane upon the face, nearly equilaterally pentagonal in transverse section; odor, and taste agreeably aromatic. Caraway depends for its medicinal properties upon its aromatic *volatile oil.*

Action and Uses.—Caraway is a diuretic, carminative, stomachic, and aromatic. A tea or infusion made from it is employed for the relief of *flatulence*, and enters into the composition of compound tincture of Cardamom.

Dose.—1 Gm.; 15 grains.

Official Derivative

Olei Cari (*Oil of Caraway*).—A colorless, or pale-yellow, thin liquid, having an aromatic odor, a spicy taste; soluble in alcohol. *Used* as a carminative, and flavoring agent.

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

CARYOPHYLLUS—Cloves

Family, Myrtaceæ.

The dried flower buds of *Eugenia aromatica*, a cultivated evergreen tree grown in many of the islands of the Indian Ocean, in tropical Africa, Brazil, and the West Indies. As soon as the buds change in color from green to pink, they are picked or shaken from the tree, collected, and dried in the sun until they change to a brown color; these are known as cloves.

Clove is about $\frac{3}{5}$ inch (15 mm.) long, brownish-black, consisting of a stem-like, solid calyx tube, obscurely four-angled and granular roughened, terminated by four teeth, and surmounted by a globular head, consisting of four petals, which cover numerous curved stamens and one style; odor strongly aromatic; taste pungent and aromatic, followed by slight numbness. The drug owes its medicinal properties to a volatile aromatic oil, of which from 50 to 85 per cent. is *eugenol.*

Action and Uses.—Clove is an aromatic stimulant and carminative. Locally applied, it gives rise to slight anesthesia and redness of the skin. The drug is employed locally as one of the ingredients of Spice Plaster, and administered internally to allay *vomiting*, remove *flatus*, and *aid digestion.* The volatile oil of cloves (*oleum caryophylli*) is used internally for the same purposes for which cloves are used, and also locally to relieve *toothache.*

Dose.—0.3 Gm.; 5 grains.

Official Preparations

Oleum Caryophylli (*Oil of Cloves*).—A volatile oil distilled from cloves containing not less than 80 per cent. by volume of *Eugenol.* It is colorless or pale yellow oil, becoming darker and thicker by age when

exposed to air, having a strong aromatic odor of cloves, and a pungent, spicy taste. It is obtained by distillation from cloves.

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

Eugenol (*Eugenol*). *Formula*, $C_{10}H_{12}O_2$.—Eugenol is a colorless or pale yellow, thin liquid, having a strong aromatic clove-like odor, a pungent, spicy taste, obtained from oil of cloves and other sources.

Eugenol is used for the same purposes and in the same doses as oil of cloves.

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

CASSIA FISTULA—Cassia Fistula

Synonym, Purging Cassia. *Family*, Leguminosæ.

The dried fruit of *Cassia fistula*, a small tree indigenous to eastern India, and also cultivated in Egypt and other parts of Africa, and western India and Brazil.

The fruit is cylindrical, 10 to 20 inches (25 to 50 Cm.) long, about 1 inch (25 mm.) in diameter, chestnut-brown in color, on one side a longitudinal groove, and on the other a smooth line or slight ridge, indicating the two sutures; indehiscent, the cavity divided transversely into numerous compartments, each containing a reddish-brown, glossy, flattish-ovoid seed embedded in a blackish-brown pulp with an odor resembling that of prunes, and a mawkish, sweet taste. When triturated with water, it yields about 20 per cent. to 35 per cent. of pulp, 60 per cent. of which is sugar, with mucilage, fat, gum, pectin, and tannin. It should be kept in pods until required for use.

Action and Uses.—The drug is used as a laxative, but as it produces severe griping pain when given alone, it is usually given in combination with other drugs for the relief of *chronic constipation*. It enters into the composition of Confection of Senna.

Dose.—2 to 4 Gm.; ½ to 1℥.

CERA ALBA—White Wax

A yellowish-white solid, somewhat translucent in thin layers, having a faint, characteristic odor, and nearly tasteless. It melts at 64° to 65° C. (147.2° to 149° F.), and by the heat of the hand it becomes plastic. It is *insoluble* in water, sparingly soluble in alcohol, completely *soluble* in ether, chloroform, and in fixed and volatile oils. Made by bleaching yellow wax.

CERA FLAVA—Yellow Wax

Synonym, Bees Wax.

A solid substance prepared from the honey-comb of the bee, *Apis mellifera* Linné.

A yellow or brownish-yellow solid, having an agreeable honey-like odor, and a faint balsamic taste. It melts at 62° to 64° C. (143.6° to 147.2° F.), and by the heat of the hand becomes plastic. It is *insoluble* in water, *sparingly soluble* in alcohol, but completely soluble in ether, chloroform, and in fixed and volatile oils.

Action and Uses.—Both white and yellow wax are principally used in the manufacture of cerates, and occasionally for increasing the melting point of *ointments* or salves.

CERIUM

Cerium, a rare metal in masses, is of a chocolate-brown color, which, when heated in air, burns vividly. In air at ordinary temperature it oxidizes, giving off a strong and disagreeable odor. It rapidly oxidizes in water, evolving hydrogen. The metal is found in a Swedish mineral, cerite, and also in gadolinite, orthite, manozite, and thorite. But one salt, the oxalate, is used as a medicine.

Official Salt

Cerii Oxalas (*Cerium Oxalate*).—A fine, white powder without odor or taste, and permanent in air, consisting chiefly of a mixture of the oxalates of cerium, didymium, and lanthanum, and other rare earths of this group. It is *insoluble* in water, alcohol, or ether. It is obtained from cerite, which is a Swedish mineral, consisting of cerium lanthanum, and didymium silicates, with numerous other minerals in small proportions, from thorite, a Norwegian mineral, and from monazite, a mineral occurring in considerable quantities in North Carolina, consisting of cerous phosphate and a mixture of other substances. It may be obtained by precipitating cerium chloride with oxalic acid, or as a product in the manufacture of thorium salts.

Action and Uses.—Cerium oxalate is looked upon as a local sedative to inflamed mucous membranes, and as a mild sedative to the nervous system. Although occasionally employed in the treatment of *diarrhœa*, it is more extensively employed for the relief of *vomiting*, particularly the *vomiting of pregnancy*. It is best *prescribed* in powders.

Dose.—0.06 Gm.; 1 grain.

CETACEUM—Spermaceti

A peculiar, concrete, fatty substance, obtained from the head of the sperm whale, *Physeter macrocephalus*.

Spermaceti is a white, somewhat translucent, slightly unctuous mass, of a scaly, crystalline fracture and a pearly luster, with a very faint odor and a bland, mild taste, becoming yellowish and rancid

on prolonged exposure. It melts at from 45° to 50° C. (113° to 122° F.), is *insoluble* in water and nearly so in cold alcohol, but is *soluble* in about 50 parts of boiling alcohol, in ether, chloroform, carbon disulphide, and fixed and volatile oils.

Uses.—Spermaceti is neither used locally nor internally, but in pharmacy is employed to give consistency to *cerates* and *ointments*. It enters into the composition of *cold cream*, known as Unguentum Aquæ Rosæ.

CHIMAPHILA—Chimaphila

Synonym, Pipsissewa. *Family*, Ericaceæ.

The dried leaves of *Chimaphila umbellata*, a small herb-like evergreen, indigenous in North America, northern Asia, and northern and central Europe, growing in dry woods and flowering in June and July. The dried leaves are from 1 to 2 inches (2.5 to 5 Cm.) long, $\frac{1}{3}$ to $\frac{1}{2}$ inch (8 to 12 mm.) broad, oblanceolate, the upper portion coarsely and sharply serrate, acute or somewhat obtuse, the lower wedge-shaped and nearly entire; coriaceous, smooth, and uniformly dark green on the upper surface, paler beneath, the veins being very prominent; odor slight; taste astringent and bitter. The leaves contain *chimaphilin*, *arbutin*, *tannic acid*, a small quantity of volatile oil, resin, and gum.

Action and Uses.—Chimaphila is slightly astringent, diuretic, and tonic. It is employed in the treatment of *renal dropsy*, *scrofula*, and *rheumatism*.

Dose.—2 to 4 Gm.; $\frac{1}{2}$ to 1ʒ.

Official Preparation

Fluidextractum Chimaphilæ (*Fluidextract of Chimaphila*).—Menstruum, diluted alcohol.

Dose.—2 Cc.; 30 minims.

CHLORALFORMAMIDUM—Chloralformamide

Synonym, Chloralimide. *Formula*, $C_3H_4Cl_3NO_2$ = 190.96.

A crystalline solid ($CCl_3.CH(OH)NH.COH$) made by the direct union of Formamide with Anhydrous Chloral. Chloralformamide is seen as colorless, lustrous crystals, without odor, and having a bitter taste. *Soluble* in about 18.7 parts of water, and 1.3 parts of alcohol, and readily soluble in ether, glycerin, acetone, and acetic ether. It is decomposed by water at or about 60° C. (140° F.) hydrated chloral and formamide being produced.

Action and Uses.—Chloralformamidum is a hypnotic, less certain and slower in its action than hydrated chloral, but almost entirely free from any depressing action upon the circulation, nor is it scarcely

at all irritating to the mucous membranes. The drug is employed to relieve *insomnia* not due to pain.

Incompatibilities.—Hot water and alkalies decompose chloralformamide, forming hydrated chloral and formamide.

Dose.—0.6 to 2 Gm.; 10 to 30 grains.

CHLORALUM HYDRATUM—Hydrated Chloral

Formula, $C_2HCl_3O + H_2O = 164.12$.

Hydrated chloral is a crystalline solid, composed of trichloraldehyde or chloral ($CCl_3.COH$) with the elements of one molecule of water.

It is seen in rhomboidal, colorless, transparent crystals or fragments, having an aromatic, bitter, and slightly acrid odor, and a bitterish, caustic taste; it slowly volatilizes in dry atmosphere, and deliquesces in moist atmosphere. It is freely *soluble* in water and other aqueous liquids. It is made by acting upon absolute alcohol with chlorine, and hydrating with water.

Action and Uses.—Locally, hydrated chloral is an irritant, and when administered internally should be dissolved in water, and freely diluted to prevent irritation of the mucous membranes. Internally, it is a hypnotic, a depressant to the circulation, lowers temperature, and in moderate doses is a diuretic. In full doses, if long continued, it becomes an irritant to the kidneys. It is *used* to *induce sleep*, to relieve *convulsions*, and to *quiet nervous excitement*.

Incompatibilities.—When triturated with about equal parts of camphor, menthol, thymol, or phenol, it liquefies, and is decomposed by caustic alkalies, alkaline earths, and ammonia, with the formation of chloroform.

Poisoning.—In poisonous doses, hydrated chloral induces deep sleep, contraction of the pupils, great enfeeblement of the circulation, cold, clammy skin. The *treatment of poisoning* by hydrated chloral is to wash out the stomach, use strychnine hypodermically to stimulate the respiration, and apply external heat to maintain bodily temperature.

Dose.—0.3 to 2 Gm.; 5 to 30 grains.

CHLORINE COMPOUNDS

Chlorine and all preparations yielding the gas readily are, indirectly, powerful oxidizers, and therefore useful for bleaching, deodorizing, and disinfecting. The strong affinity of chlorine for hydrogen causes it to decompose compounds containing hydrogen and oxygen, in chemical combination, uniting with the hydrogen to form HCl, and setting free nascent oxygen, which immediately enters into new chemical combinations, thereby acting as a powerful oxidizer. The value of the chlorine compounds is in proportion to their richness in the gas and the readiness with which they yield it.

The disadvantages of chlorine as a disinfectant are the same as the disadvantages of sulphur dioxide—it irritates the eyes and mucous membrane of the respiratory tract, and is destructive to all fabrics.

Poisoning.—Poisoning by chlorine compounds should be treated by washing out the stomach and administering oils and milk.

Official Preparations Depending for Their Value upon Chlorine in Loose Chemical Combination

Liquor Chlori Compositus (*Compound Chlorine Solution*).—Compound chlorine solution is an aqueous liquid containing, when freshly prepared, about 0.4 per cent. of chlorine, with some oxides of chlorine and potassium chloride. As a disinfecting agent it is dependent upon chlorine, and, to a lesser extent, the oxide of chlorine. The solution may be readily prepared by generating chlorine in a large flask by adding hydrochloric acid, diluted by about an equal quantity of water, to potassium chlorate, heating on a water bath for about three minutes, and adding water in two successive portions, agitating the flask each time water is added. The solution should be freshly prepared when wanted. This solution furnishes chlorine in a convenient and cheap form for use as a disinfectant in the sick room. When well diluted it is useful as a gargle for *septic sore throat*, and as a mouth wash for cases of *ulcerative stomatitis*.

Calx Chlorinata (*Chlorinated Lime, Chlorinated Calcium Oxide*). *Synonym*, Bleaching Powder.—Chlorinated lime is not a definite chemical salt, but a compound, resulting from the action of chlorine upon the calcium hydroxide, and containing not less than 30 per cent. of available *chlorine*. It is often improperly called chloride of lime. As it liberates its chlorine upon exposure, it should be kept in well-closed vessels in a cool and a dark place. Chlorinated lime is a white or grayish-white granular powder, exhaling the odor of hypochlorous acid, has a repulsive saline taste, and becomes moist and gradually decomposes upon exposure to air. It is only *partially soluble* in water or in alcohol. Aqueous solutions of it first color litmus paper blue, and then bleach it. The compound is rapidly decomposed with the liberation of chlorine by adding to it hydrochloric, sulphuric, or acetic acid.

Action and Uses.—The value of this compound as a disinfectant and bleaching agent is dependent upon the large quantity of chlorine which may be liberated from it. It is available as a carrier of chlorine in the same way that the sponge is available for carrying water. Aside from its value as a compound from which large quantities of chlorine may be liberated, it has the property of absorbing moisture and acts as a desiccant, and thereby prohibits the growth of microbes. As a disinfectant, it is valuable for disinfecting the urine, stools, and sputum of patients suffering from infectious diseases. It is a very popular

compound for disinfecting sewers, cesspools, and foul-smelling disease-breeding foci. A 1 per cent. aqueous mixture is sometimes used as a mouth wash in *ulcerated stomatitis*, and as a gargle in the treatment of *putrid sore throat*. It is rarely administered internally in *fermentative diseases* of the stomach and intestines. Locally, it is an irritant to the skin and mucous membranes, and in overdoses causes gastro-enteritis.

Dose.—0.12 to 0.3 Gm.; 2 to 5 grains.

Liquor Sodæ Chlorinatæ (*Solution of Chlorinated Soda*). *Synonym*, Labarraque's Solution.—An aqueous solution containing at least 2.4 per cent. by weight of available chlorine and several chlorine compounds of sodium. It is made by decomposing a solution of chlorinated lime by a solution of monohydrated sodium carbonate. The solution is used as a disinfectant and deodorant. When using to disinfect dejecta from the sick room, it should be placed in the vessel intended to receive the dejecta, and be permitted to remain in contact with it for twenty to thirty minutes before being emptied.

CHLOROFORMUM—Chloroform $CHCl_3$

Chloroform is a heavy, clear, colorless, mobile, diffusible liquid, consisting of 99 to 99.4 per cent., by weight, of absolute chloroform, $CHCl_3$, and 0.6 to 1 per cent. of alcohol. It has a characteristic ethereal odor, a burning, sweetish taste, and is *soluble* in about 200 times its volume of water, and all proportions in alcohol, ether, benzin, petroleum benzin, and the fixed and volatile oils. Being sparingly soluble and much heavier than water, in mixing the two liquids the excess of chloroform collects at the bottom of the container. Chloroform is not inflammable like ether, nor is its vapor highly inflammable, but, if heated, the vapor may be made to burn with a green flame. The vapor of chloroform readily decomposes in the presence of an open fire or gas range, with the production of gases which are extremely irritating to the eyes and respiratory mucous membranes.

Chloroform may be produced by decomposing hydrated chloral with sodium hydroxide, but is usually manufactured on a large scale by acting upon acetone or ketones with calcium hypochloride. Chloroform in its purest state readily decomposes upon keeping, particularly if exposed to light, and for this reason a small percentage of alcohol (0.6 to 1 per cent.) should be added as a preservative, and it should be kept in dark amber-colored, glass-stoppered, bottles in a cool and dark place. As a general anesthetic, only chloroform of the highest purity should be employed, as the commercial products may contain chlorides, free chlorine, impurity decomposable by sulphuric acid, odorous decomposition products, and chlorinated decomposition products.

The *Pharmacopœia* directs the following tests for the identity and detection of impurities: It should volatilize at a low temperature, and boil at 60° to 61° C. (140° to 141° F.). If a small quantity of chloro-

form be poured upon a piece of clean odorless filter paper, laid flat upon a warm glass plate, and the plate be rocked from side to side until the liquid is all evaporated, no foreign odor should be perceptible as the last portions disappear from the paper, and the paper should be left odorless. If 10 Cc. of chloroform be shaken with 20 Cc. of water and the liquid be allowed to separate completely, the water should be neutral to litmus paper, and should not be affected by silver nitrate solution (absence of chlorides), or colored by an aqueous solution of potassium iodide (absence of free chlorine). The absence of impurities decomposable by sulphuric acid may be determined by adding 4 Cc. of concentrated sulphuric acid to 40 Cc. of chloroform contained in a glass-stoppered cylinder, and well shaken for twenty minutes, and the liquids be allowed to separate completely so that both are transparent, the chloroform should remain colorless, and the acid should appear colorless, or very nearly colorless, when seen in a stratum of not less than $\frac{3}{5}$ inch (15 mm.) in thickness.

Action and Uses.—Chloroform is an irritant to the skin, and if confined underneath a watch crystal will produce vesication; if administered hypodermically, it produces sloughing. On account of its irritating action, it is frequently used as one of the ingredients in liniments, to be used as counterirritants. If administered by inhalation, it is a general anesthetic, the anesthesia coming on more promptly than after the inhalation of ether. In the greater majority of cases it is probably not as safe an anesthetic as is ether, but in certain diseased conditions it is to be preferred. On account of the dangers resulting from excessive quantities when administered by inhalation, it should not be poured upon the mask, but should be allowed to drop upon it drop by drop, the mask being held sufficiently far away from the mouth and nose of the person being anesthetized to permit the vapor of chloroform to be inhaled with a large quantity of air. In other words, chloroform when used as an anesthetic should be administered by the drop method and should be well diluted with air. When inhaled or administered internally, chloroform is a powerful depressant to the respiration, circulation, and the temperature. The respiration and circulation of patients under the influence of chloroform should be carefully watched, so that the anesthetic may be withdrawn at the very beginning of any symptoms indicative of any abnormal conditions of either of these functions; furthermore, patients under the influence of chloroform should, as a rule, be protected from cold, by being covered with blankets, and surrounded by warm-water bags. Chloroform should never be administered in concentrated vapor, and if persons being anesthetized by it should begin to struggle, the mask should be removed immediately and kept away from the face until the patient again becomes composed. Internally, chloroform is employed as an antispasmodic, in *renal*, *hepatic*, and *intestinal colic*, and *gastralgia*. When taken internally chloroform should be well diluted.

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

Official Preparations

Aqua Chloroformi (*Chloroform Water*).—A saturated solution of Chloroform in Water.

Dose.—4 to 16 Cc.; 1 to 4 f3.

Spiritus Chloroformi (*Spirit of Chloroform*).—A 6 per cent., by volume, solution of Chloroform and Alcohol.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

Emulsum Chloroformi (*Emulsion of Chloroform*).—A 4 per cent. emulsion of Chloroform emulsified by the use of 1 per cent. of Powdered Tragacanth and 6 per cent. of Expressed Oil of Almond in enough Water to make 100 parts.

Dose.—4 to 8 Cc.; 1 to 2 f3.

Linimentum Chloroformi (*Chloroform Liniment*).—A 30 per cent., by volume, of Chloroform in Soap Liniment.

Used locally by inunction as a counterirritant.

CHONDRUS—Chondrus

Synonym, Irish Moss. *Family,* Gigartinaceæ.

The dried plant of the *Chondrus crispus*, a seaweed growing from rocks and stones in the Atlantic Ocean, especially abundant along the western coast of Ireland, and also collected along the coast of the New England States in the United States.

After drying, it is usually seen in light yellow or yellowish-white masses; the plant consisting of a slender, somewhat flattened base, about one-half the length of the entire frond, which after repeated forking terminates in a number of palmately branching, somewhat enlarged, commonly emarginate or two-lobed segments; translucent, sometimes with fruit bodies embedded near the apex of the segment; somewhat cartilaginous; having a slight, sea-weed odor, and a mucilaginous, somewhat saline taste. The drug owes its medicinal properties to the large quantity of *mucilaginous principle* (50 to 80 per cent.) which may be extracted from it by boiling. The mucilage principle is almost entirely soluble in hot water, and sparingly soluble in cold water; it is not precipitated by alcohol nor lead acetate, nor is it changed to a blue color by the addition of iodine.

Action and Uses.—Chondrus is demulcent, nutritive, and dietetic. It is employed in the treatment of *dysentery, diarrhœa, acute inflammation of the bladder*, and as a local application to soothe *inflammatory diseases of the skin* and *mucous membrane*. The mucilage is employed in making emulsions and mixtures.

There are no official preparations of it, but the mucilage may be made by macerating half an ounce of chondrus in cold water for ten

soothing agent to mucous membrane

minutes, pouring off the water, and then placing it in a pint and one-half of water, boiling down to a pint and straining.

Dose.—Any quantity.

CHROMII TRIOXIDUM—Chromium Trioxide

Formula, $CrO_3 = 99.34$.

Chromium trioxide is seen as small, needle-shaped crystals, of a dark purplish-red color and metallic luster, made by decomposing Potassium Dichromate with Sulphuric Acid. It is odorless; destructive to animal and vegetable tissues; deliquescent in moist atmosphere; freely *soluble* in water, and should contain not less than 90 per cent. of chromic anhydride. This substance is a powerful oxidizer, and should not be brought in contact with readily oxidizable substances, such as cork, tannic acid, sugar, alcohol, ether, glycerin, nor other organic solvents, as decomposition takes place sometimes with dangerous results.

Action and Uses.—Chromium trioxide, either in crystals or solution, is a caustic. It is used locally to remove small growths, such as *warts* and *condylomata* from the skin. As poisoning and death have resulted from freely local application, care should be exercised in employing it.

CHRYSAROBINUM—Chrysarobin

Synonym, Chrysophanic Acid. *Formula*, $C_{30}H_{26}O_7 = 494.46$. *Family*, Leguminosæ.

Chrysarobin is a neutral principle extracted from Goa Powder, a substance found deposited in the wood of *Vouacapoua Araroba*, a large tree growing in the forests of Bahia and Brazil.

Chrysarobin is a pale, orange-yellow, microcrystalline powder, irritating to the skin and mucous membranes, and without odor or taste. It is *soluble* in 4812 parts of water and 308 parts of alcohol.

Action and Uses.—Internally and locally, chrysarobin is an irritant. It is rarely given internally, as it is capable of producing gastro-enteritis with violent vomiting and purging. Locally in ointments it is used in the treatment of *chronic skin diseases* and *chronic eczema*, but, even in these cases, it has been known to become absorbed and give rise to vomiting and purging. Ointments of chrysarobin stain the skin a dark color, and also stain all fabrics with which it comes in contact.

Official Preparation

Unguentum Chrysarobini (*Chrysarobin Ointment*).—Made by triturating 6 Gm. of Chrysarobin with 95 Gm. of Benzoinated Lard, pre-

viously melted, and heating the mixture on a water-bath, occasionally stirring for twenty minutes, and then straining and stirring until it congeals.

CIMICIFUGA—Cimicifuga

Family, Ranunculaceæ.

The dried rhizome and roots of *Cimicifuga racemosa*, a perennial shrub growing in rich woodlands of the United States and Canada. The rhizome and roots should be collected in autumn, and only used when fresh, as they contain principles which volatilize and decompose upon keeping. The drug contains a crystalline principle known as *cimicifugin*, resins, and volatile oils.

Action and Uses.—Cimicifuga is looked upon as a mild stimulant to the heart, a sedative to the nervous system, a bitter tonic, and an alterative. It is used in the treatment of *chorea*, *amenorrhœa*, *menorrhagia*, and *dysmenorrhœa*.

Incompatibilities.—The liquid preparations of cimicifuga contain large quantities of resins, which are precipitated by the addition of water.

Official Preparations

Extractum Cimicifugæ (*Extract of Cimicifuga*).—A dry powdered extract made by evaporating 100 Cc. of Fluidextract of Cimicifuga to dryness, powdering, and mixing with enough powder of glycyrrhiza to make 25 Gm.

Dose.—0.06 to 0.3 Gm.; 1 to 5 grains.

Fluidextractum Cimicifugæ (*Fluidextract of Cimicifuga*).—Menstruum, diluted alcohol.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

Tinctura Cimicifugæ (*Tincture of Cimicifuga*).—Made by percolating 200 Gm. of Cimicifuga with Alcohol to make 1000 Cc.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

CINCHONA—Cinchona

Synonym, Calisaya Bark, Peruvian Bark.

The dried bark of the yellow or pale cinchonas, yielding not less than 5 per cent. of total anhydrous cinchona alkaloids, of which $\frac{4}{5}$ should be ether-soluble. In the U. S. P. cinchona is the dried bark of *Cinchona Ledgeriana*, *Cinchona Calisaya*, *Cinchona officinalis*, and of hybrids of these with other species of cinchonas.

The bark is seen in quills or curved pieces of variable sizes, usually $1\frac{1}{2}$ to $\frac{1}{5}$ inch (2 to 5 mm.) thick; externally gray, rarely brownish-gray; inner surface light cinnamon-brown; odor, slightly aromatic; taste, bitter and somewhat astringent.

CINCHONA RUBRA—Red Cinchona

Family, Rubiaceæ.

The dried bark of *Cinchona succirubra,* or of its hybrids, should yield not less than 5 per cent. of anhydrous cinchona alkaloids.

Red cinchona is seen in quills or curved pieces of variable sizes, the bark $\frac{1}{12}$ to $\frac{1}{5}$ inch (2 to 5 mm.) thick; externally, gray or grayish-brown; internally, the surface is reddish or orange-brown; taste bitter and astringent.

The habitat of the cinchona tree is South America, from 10 north latitude to 20 south latitude. The trees thrive best at an elevation of from five thousand to eight thousand feet above the sea level, where the mean temperature is about 13° C. (55° F.), and where there are long rainy seasons during the greater part of the year. Formerly, cinchona bark was obtained almost entirely from trees growing in the forests on the eastern slope of the central chain of the Andes from Bolivia to Peru, Ecuador, and also on the eastern slope of the western Cordilleras chain, thence to the highlands of Colombia, Venezuela, and to the Caribbean Sea. As the destruction of these trees growing wild in the forests was great, and their reproduction slow, most of the cinchona bark is now obtained from trees cultivated in Bolivia, Java, and India. There are 25 to 30 natural alkaloids contained in cinchona bark, the most important being *quinine*, *quinidine*, *cinchonine*, and *cinchonidine;* in addition to the alkaloids, there is found in cinchona bark, *quinic acid, quinovic acid,* and *cinchotannic acid.*

Action and Uses.—Cinchona, its alkaloids and preparations, when given in full doses, cause ringing in the ears, vertigo, and a sensation of cerebral fulness. In *overdoses* they produce roaring in the ears, headache, deafness, disorder of vision and blindness, epistaxis, and irritability of the bladder. In *moderate doses,* the preparations of cinchona and its alkaloids are used as bitter tonics, increase the appetite, promote digestion, but when long continued, produce gastric irritability with loss of appetite. The drug, preparations, and alkaloids are stimulants to the circulation, as they are to the entire body, and for this reason are frequently employed in asthenic conditions. No official preparations of cinchona are sufficiently strong in alkaloids to be used in the treatment of *malaria,* but quinine and other cinchona alkaloids are used in medicine as antiperiodics in the treatment of malaria, which they cure by acting upon plasmodium malariæ in the blood. In *anemia,* medicinal doses of the alkaloids increase the number of red blood corpuscles, and in the earlier stages of beginning inflammations lessen the diapedesis of the white corpuscles through the walls of the capillaries. The cinchona alkaloids are absorbed from the stomach, where the reaction is acid.

Incompatibilities.—The preparations of cinchona, on account of the tannic acid contained in them, are incompatible with all ferric salts

and solutions, with which they form a black precipitate or ferric tannate, and with most of the metallic salts, especially those of lead, copper, silver, mercury, bismuth, and antimony. The alkaloids contained in the preparations of cinchona are precipitated or thrown out of solution by the addition of any of the general alkaloidal reagents, such as alkali hydroxides, alkali carbonates or bicarbonates, soluble borates, and sodium phosphate, soluble salicylates, benzoates, bromides, iodides, and acetates, a solution of corrosive mercurial chloride with potassium iodide. The bitter taste of the preparations of cinchona and its alkaloids is best disguised by the fluidextract of glycyrrhiza, or by glycyrrhizin.

Official Preparations

Fluidextractum Cinchonæ (*Fluidextract of Cinchona*).—Menstruum used for percolating: Alcohol, 8 parts; Glycerin, 1 part; Water, 1 part.

Dose.—As a bitter tonic: 1 Cc.; 15 minims.

Tinctura Cinchonæ (*Tincture of Cinchona*).—Made by percolating 20 Gm. of Cinchona with a menstruum of Alcohol, Glycerin, and Water to make 100 Cc.

Dose.—As a bitter tonic: 4 Cc.; 1 f℥.

Tinctura Cinchonæ Compositæ (*Compound Tincture of Cinchona*). *Synonym*, Huxham's Tincture.—Made by percolating 10 Gm. of Red Cinchona Bark, 8 Gm. of Bitter Orange Peel, and 2 Gm. of Serpentaria, with a menstruum of Alcohol, Glycerin, and Water.

Dose.—4 Cc.; 1 f ℥.

Official Alkaloids and Alkaloidal Salts of Cinchona

Quinina (*Quinine*). *Formula*, $C_{20}H_{24}N_2O_2 + 3H_2O = 375.46$.—This most important alkaloid of cinchona is a white, flaky, or microcrystalline powder, slightly efflorescent in dry air. It is *soluble* in 1750 parts of water, and in 0.6 part of alcohol; it is also soluble in 4.5 parts of ether, 1.9 parts of chloroform, and in 150 parts of glycerin.

Action and Uses.—It is used as an antiperiodic, tonic, and antipyretic. The effects of quinine have been described under cinchona. It is best *administered* in freshly made pills or capsules, but, if desired, may be administered in mixtures or lozenges. The best excipient for making quinine pills, or the pills of other cinchona alkaloids, is glycerin; this substance, being hygroscopic, prevents the pills from becoming dry and hard.

Old quinine pills and compressed tablets of quinine which have become hard are liable to pass through the stomach without disintegrating, and in the intestinal tract, which, if alkaline, will not be dissolved and absorbed. For children and others who cannot or will not take pills, quinine, or other alkaloids of cinchona, may be given in a mixture along with fluidextract of glycyrrhiza, glycyrrhizin, or

in the syrup of yerba santa to partially disguise the bitter taste. Lozenges, which are only slightly bitter, made up with quinine tannate, a very feeble and comparatively insoluble salt of quinine, powdered chocolate, and sugar, are sometimes administered to children.

Dose.—0.06 to 1.2 Gm.; 1 to 20 grains.

Quininæ Bisulphas (*Quinine Bisulphate*). *Formula*, $C_{20}H_{21}N_2O_2.H_2SO_4 + 7H_2O = 544.33$.—Colorless, transparent, or whitish crystals or small needles; efflorescent when exposed to air. *Soluble* in 8.5 parts of water, 18 parts of alcohol, and 18 parts of glycerin. Its aqueous solution has a strong acid reaction, and shows a blue fluorescence.

Action and Uses.—The action of this salt of quinine is the same as those of cinchona and quinine. Being the most soluble salt of quinine, it is more extensively employed for hypodermic injection than any other of the quinine salts.

Dose.—0.06 to 1 Gm.; 1 to 15 grains.

Quininæ Hydrobromidum (*Quinine Hydrobromide*). *Synonym*, Quinine Hydrobromate. *Formula*, $C_{20}H_{24}N_2O_2.HBr + H_2O = 420.06$.—White, light, silky needles; efflorescent upon exposure to air. *Soluble* in 40 parts of water, 0.6 part of alcohol, 8 parts of glycerin. Its solutions are neutral or slightly alkaline to litmus paper.

Action and Uses.—The same as those of quinine. This is a particularly valuable salt of quinine, owing to its free solubility, and its strength in quinine alkaloid. Being a bromide, it is supposed to be a sedative to the nervous tissues, in some slight degree, and less likely to produce vertigo. It is suitable for hypodermic use.

Dose.—0.06 to 1 Gm.; 1 to 15 grains.

Quininæ Hydrochloridum (*Quinine Hydrochloride*). *Synonym*, Quinine Hydrochlorate. *Formula*, $C_{20}H_{24}N_2O_2.HCl + 2H_2O = 393.76$.—White, silky, glistening needles; efflorescent upon exposure to air. *Soluble* in 18 parts of water, 0.6 part of alcohol, and 8 parts of glycerin. Its aqueous solution is neutral or faintly alkaline to red litmus paper.

Action and Uses.—The same as quinine, being much more soluble and stronger in alkaloid. It is the most suitable salt of quinine for hypodermic use.

Dose.—0.06 to 1 Gm.; 1 to 15 grains.

Quininæ Salicylas (*Quinine Salicylate*). *Formula*, $2C_{20}H_{24}N_2O_2.C_7H_6O_3 + H_2O = 935.54$.—Colorless needles, permanent in air, but on keeping assumes a pink color. *Soluble* in 77 parts of water, 11 parts of alcohol, and 16 parts of glycerin. Its aqueous solution is alkaline to red litmus paper.

Action and Uses.—The same as those of quinine. As it contains a large quantity of salicylic acid it is sometimes used in rheumatic states.

Incompatibilities.—Same as those of quinine.

Dose.—0.3 to 1 Gm.; 5 to 15 grains.

Quininæ Sulphas (*Quinine Sulphate*). *Formula,* $(C_{20}H_{24}N_2O_2)_2H_2SO_4 + 7H_2O = 866.15$.—White, silky, glistening crystals or monoclinic needles; efflorescent in dry air, and becoming lusterless. Its aqueous solution is neutral to litmus paper, and when acidulated with diluted sulphuric acid, develops a vivid blue fluorescence. It is *soluble* in 720 parts of water, 86 parts of alcohol, and 36 parts of glycerin. Its solubility in water is greatly increased by the addition of diluted acids.

Action and Uses.—The same as those of quinine. For no good reason this alkaloidal salt is more extensively employed than the other alkaloidal salts of quinine.

Incompatibilities.—Aqueous solutions of the salts of quinine are precipitated by alkaline carbonates, soluble borates, soluble acetates, soluble benzoates, sodium phosphate, tannic acid, a solution of potassium iodide with corrosive mercuric chloride.

Dose.—0.06 to 1 Gm.; 1 to 15 grains.

Cinchonidinæ Sulphas (*Cinchonidine Sulphate*). *Formula,* $(C_{19}H_{22}N_2O)_2.H_2SO_4 + 3H_2O = 735.05$.—White, glistening, silky needles or prisms. *Soluble* in 63 parts of water, and 72 parts of alcohol. Its aqueous solution is neutral, or only faintly alkaline to phenolphthalein solution.

Action and Uses.—Same as those of quinine, except that it is less powerful.

Incompatibilities.—Same as those of the salts of quinine.

Dose.—0.3 to 1.3 Gm.; 5 to 20 grains.

Cinchoninæ Sulphas (*Cinchonine Sulphate*). *Formula,* $(C_{19}H_{22}N_2O)_2.H_2SO_4 + 2H_2O = 717.17$.—White, hard, lustrous prismatic crystals; permanent in air. *Soluble* in 58 parts of water, 10 parts of alcohol.

Action and Uses.—The same as those of quinine, except that it is much less powerful.

Incompatibilities.—The same as those of the salts of quinine.

Dose.—0.3 to 1.3 Gm.; 5 to 20 grains.

CINNAMOMUM SAIGONICUM—Saigon Cinnamon

Family, Lauraceæ.

The bark of an undetermined species of *Cinnamomum*. Probably collected from wild trees growing in the mountainous area of Annam. This variety of cinnamon, as found in the market, is not deprived of its outer corky or stone-cell layer.

It is seen in squills, $\frac{1}{12}$ to $\frac{1}{8}$ inch (2 to 3 mm.) thick; external surface gray or light grayish-brown, with whitish patches; commonly more or less rough, with numerous warts and some transverse ridges, and fine longitudinal wrinkles; the inner surface is cinnamon-brown or dark brown; its odor is agreeably aromatic; its taste, sweet, warmly aromatic, somewhat astringent. This variety of cinnamon enters into

the composition of Aromatic Powder, Compound Tincture of Cardamom, Compound Tincture of Gambir, Compound Tincture of Lavender, Aromatic Tincture of Rhubarb, Wine of Opium, and Tincture of Cinnamon, Aromatic Powder, and Aromatic Fluidextract.

CINNAMOMUM ZEYLANICUM—Ceylon Cinnamon

Family, Lauraceæ.

The inner bark of the shoots of *Cinnamomum zeylanicum.* Cultivated extensively in Ceylon. The bark is obtained from the shoots of cultivated plants which have reached the age of about two years, are 1 or 2 inches (25 to 50 mm) in diameter, and before the astringent corky layer has had a chance to form, and the external surface or layer of stone cells scraped off.

This variety of cinnamon is seen in closely rolled quills of eight or more layers of thin bark; it is of a pale yellowish-brown color; its outer surface is smooth, marked with wavy lines of bast bundles, and its inner surface striate; it has an agreeable aromatic odor, a sweet and warmly aromatic taste.

The bark of *Cinnamon Cassia* is known as Chinese cinnamon or Cassia, and the oil from this bark as the *oil of cassia.* Cinnamon depends for its medicinal action upon the volatile oil of cinnamon, and contains in addition mucilage, resin, and tannin.

Action and Uses.—Cinnamon is employed as a carminative, an agreeable aromatic, astringent, and hemostatic. The oil is sometimes used as an antiseptic, the powdered drug, tincture, oil, and all preparations of the oil are employed to give an agreeable taste or flavor to more active remedies. They are *used* for the relief of *flatulency, nausea, vomiting,* and *serous diarrhœa.* The oil is also given internally in the treatment of *oozing hemorrhages.*

Official Preparation and Derivative

Tinctura Cinnamomi (*Tincture of Cinnamon*).—Made by percolating 20 Gm. of Saigon cinnamon with a menstruum of Alcohol, Glycerin, and Water to make 100 Cc.

Dose.—2 to 4 Cc.; 30 to 60 minims.

Oleum Cinnamomi (*Oil of Cinnamon*). *Synonym,* Oil of Cassia.—A volatile oil, obtained by the process of distillation from Cassia cinnamon, and yielding not less than 75 per cent., by volume, of Cinnamic Aldehyde.

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

Official Preparations of Oil of Cinnamon

Aqua Cinnamomi (*Cinnamon Water*).—Made by triturating 2 Cc. of Oil of Cinnamon with 15 Gm. of Purified Talc, adding Distilled Water, gradually triturating, and filtering to make 1000 Cc.

Used as a carminative, agreeable vehicle, and solvent.

Dose.—4 to 16 Cc.; 1 to 4 f℥.

Spiritus Cinnamomi (*Spirit of Cinnamon*).—Made by dissolving 10 Cc. of the Oil of Cinnamon in 90 Cc. of Alcohol.

Used as a carminative, flavoring agent, and as an agreeable vehicle for resins, resinous fluidextracts, and resinous tinctures.

Dose.—0.6 to 4 Cc.; 10 minims to 1 f℥

Derivative of Oil of Cinnamon

Cinnaldehydum (*Cinnamic Aldehyde*). *Synonym*, Synthetic oil of Cassia. *Formula*, C_9H_8O.—A colorless liquid, nearly identical with the oil of cinnamon, prepared synthetically by acting upon a mixture of acid aldehyde and benzaldehyde with hydrochloric acid gas, or obtained from oil of cinnamon. It should contain not less than 95 per cent. of cinnamic aldehyde.

Action and Uses.—The action and uses of cinnamic aldehyde are the same as those of oil of cinnamon. Much of the oil of cinnamon being adulterated, it is thought by many that this substance should be preferred to the natural oil, both by reason of its greater purity and cheapness.

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

COCA—Coca

Synonym, Erythroxylon. *Family*, Erythroxylaceæ.

The dried leaves of *Erythroxylon Coca* or *Erythroxylon Truxillense*, yielding not less than 0.5 per cent. of ether-soluble alkaloids. Two varieties of coca leaves are official in the *U. S. Pharmacopœia*, namely, Huanuco Coca, from Erythroxylon Coca, and Truxillo Coca from Erythroxylon Truxillense. The coca shrubs or small trees grow to a height of from 6 to 10 feet, and are extensively cultivated in South America. The coca imported to this country is chiefly from Brazil, Venezuela, and Argentina, where it grows along the eastern slope of the Andes.

Huanuco Coca leaves are greenish-brown, slightly glossy, stout, 25 to 75 Cm. long, nearly elliptical, and with a short leaf stalk. On the under surface of the leaf running longitudinally on either side of the midrib, and about one-third of the distance between it and the margin of the leaf, is a conspicuous line. The leaf has a slightly bitter, and faintly aromatic taste, followed by numbness of the mucous membrane of the tongue and mouth. The Truxillo Coca leaf is smaller than the Huanuco leaf, being of a pale green color, thin, smooth, but not shiny, with a short, stout leaf stem, and the blade 1.6 to 5 Cm. long and one-third to one-half as broad; its shape is obovate or oblanceolate; underneath may be seen two irregular lines, usually incomplete or

obscure, and frequently wanting, run beside the midrib at about one-third of the distance from it to the margin. Coca depends for its medicinal properties upon the alkaloid *cocaine*, and in addition contains small quantities of resin, tannin, and chlorophyll.

Action and Uses.—Coca and its preparations, when taken internally, give rise to a feeling of well-being, and is a stimulant and excitant to the nervous system, in the same manner as coffee or tea. Overdoses are followed by loss of speech, blindness, nausea, vomiting, collapse, and unconsciousness. The fluidextract and wine of coca are used as stimulants during temporary periods of *depression* and *asthenia;* as they add nothing to the tissues of the body, they cannot be looked upon as tonics, and their indiscriminate use is harmful.

Official Preparations and Derivative

Fluidextractum Cocæ (*Fluidextract of Coca*).—Made with a menstruum of Diluted Alcohol, and should yield upon assay not less than 0.5 Gm. of ether-soluble alkaloids in each 100 Cc.

Dose.—2 to 4 Cc.; ½ to 1 f℥.

Vinum Cocæ (*Wine of Coca*).—Made by mixing 65 Cc. of the Fluidextract of Coca in a solution of Alcohol, 75 Cc.; Sugar, 65 Gm.; and Red Wine, a sufficient quantity to make 1000 Cc.

Dose.—15 to 30 Cc.; 4 to 8 f℥.

Cocaina (*Cocaine*). *Formula*, $C_{17}H_{21}NO_4$, = 300.92.—This alkaloid, derived from the Coca leaves, has a slightly bitter taste, followed by numbness of the mucous membranes of the tongue and mouth with which it comes in contact. *Soluble* in 600 parts of water, 5 parts of alcohol, and also soluble in volatile and fixed oils, ether, chloroform, and benzin. It is insoluble in glycerin.

Dose.—0.015 to 0.06 Gm.; ¼ to 1 grain.

Oleatum Cocainæ (*Oleate of Cocaine*).—Made by triturating 5 Gm. of Cocaine in a tared mortar with 5 Cc. of Alcohol and then adding 5 Cc. of Oleic Acid, warming the mortar, and stirring until the alcohol is evaporated, adding 45 Gm. of Oleic Acid and stirring until the cocaine is dissolved, and lastly adding enough Olive Oil to make the finished product weigh 100 Gm.

Cocainæ Hydrochloridum (*Cocaine Hydrochloride*). *Formula*, $C_{17}H_{21}NO_4.HCl$ = 337.10.—On account of its great solubility in water, this salt of cocaine is more extensively employed than the alkaloid. It is *soluble* in 0.4 part of water, 2.6 parts of alcohol, and also soluble in chloroform. It is insoluble in benzin, petroleum benzin, and ether. Its aqueous solution is neutral to litmus paper.

Action and Uses.—The value of cocaine as a medicine depends almost entirely upon its action as a local anesthetic. Internally, it is a cerebral excitant, and a temporary stimulant to the circulation and respiration.

In *overdoses*, it gives rise to vertigo, disturbance of vision or temporary blindness, nervous excitability, respiratory irregularities, profuse sweating, and sometimes epileptiform convulsions. These untoward effects may be brought about by the use of the drug internally, hypodermically, or upon mucous membranes. The application of the drug to the skin is almost entirely devoid of effect, but if there is an abrasion of the skin or if injected underneath the skin or applied locally to mucous membranes, the part becomes blanched from contraction of the delicate bloodvessels of the part, and loses its sensation to touch and painful impressions, by reason of paralysis of the sensory nerves with which it comes in contact. Hypodermic injection underneath the skin, or local application to the mucous membrane, produces *local anesthesia* of the part, during which time painless surgical operations may be performed upon the area within its influence. The usual strength of solutions used locally for producing local anesthesia upon the mucous membranes is about 4 per cent., in water, but for hypodermic use, much weaker solutions give entirely satisfactory results.

The following solutions suggested by Schleich for producing infiltration anesthesia are extensively employed:

Cocaine	gr. iv (0.25)	gr. ij (0.12)	gr. $\frac{1}{5}$ (0.012)
Morphine hydrochloride	gr. ss (0.03)	gr. ss (0.03)	gr. $\frac{1}{10}$ (0.006)
Sodium chloride	gr. iv (0.25)	gr. iv (0.25)	gr. iv (0.25)
Sterilized distilled water	f℥ iv (120.0)	f℥ iv (120.0)	f℥ iv (120.0)

By the use of a long needle inserted into the subarachnoid cavity of the spinal cord, anesthesia of all parts of the body below the level of the diaphragm, and lasting for an hour or more, may be produced by the injection of 10 to 15 minims of a 2 per cent. solution of cocaine hydrochloride. Disagreeable after-effects, such as rise of temperature, nausea, vomiting, and cerebral excitement, are not unusual after subarachnoid injection. *Internally*, cocaine has been employed for controlling severe *vomiting*, especially the vomiting of pregnancy and of yellow fever. It is also employed hypodermically and internally as a general diffusible stimulant in profound *depression* during the later stages of *exhausting diseases*.

Incompatibilities.—Cocaine hydrochloride is precipitated from solution by alkaline carbonates or bicarbonates, sodium borate, zinc sulphate, silver nitrate, and is decomposed by boiling water.

For use in ointments or oil sprays, the alkaloid, not the salt, should be employed.

Dose.—0.015 to 0.06 Gm.; $\frac{1}{4}$ to 1 grain.

COCCUS—Cochineal

The dried female insect, *Pseudococcus cacti*, indigenous to Mexico and Central America, and cultivated in the West India Islands, the Canaries, Algiers, and southern Spain. The insects are collected from

different species of cactus, upon which they live, and killed either by the fumes of sulphur or by being dipped into boiling water.

The insects are about $\frac{1}{5}$ inch (5 mm.) long, nearly as broad, and half as thick, angularly elliptical in outline, the lower surface flat, the upper surface convex; gray or silvery purple in color if killed by the fumes of sulphur, and purplish-black if killed by being dipped into boiling water. The former variety is known as silver grain cochineal, and the latter as black grain cochineal. Its red coloring matter, known as *carminic acid* or *carmine red*, is *soluble* in water, alcohol, or ammonia water, only slightly soluble in ether, and not at all in fixed and volatile oils; alkalies change the color to purple. Upon incineration, the insect should not yield more than 6 per cent. of ash.

Action and Uses.—Cochineal is employed to impart its beautiful red color to pharmaceutical preparations. It enters into the composition of the Compound Tincture of Cardamom.

CODEINA—Codeine

See *Opium*.

COLCHICI CORMUS (*Colchici Radix*, Pharm. 1890)—Colchicum Corm

Family, Liliaceæ.

The dried corm of *Colchicum autumnale*, a perennial plant growing in moist pastures and meadows in central and southern Europe, and northern Africa.

The corm is about 1 inch (25 mm.) long, $\frac{3}{4}$ inch (18 mm.) thick, ovoid, convex on one side, with a groove on the other; externally brown, wrinkled; internally whitish. It is usually seen in the shops in transverse reniform slices about $\frac{1}{12}$ inch (2 mm.) thick; the surface of the transverse section having a papillose appearance; taste, sweetish bitter and somewhat acrid. It should contain not less than 0.35 per cent. of *colchicine*.

Dose.—0.2 to 0.4 Gm.; 3 to 6 grains.

Official Preparation

Extractum Colchici Cormi (*Extract of Colchicum Corm*).—An extract of a pilular consistency, made of colchicum corm and containing 1.4 per cent. of *colchicine*.

Dose.—0.03 to 0.12 Gm.; $\frac{1}{2}$ to 2 grains.

COLCHICI SEMEN—Colchicum Seed

Family, Liliaceæ.

The seed of *Colchicum autumnale*.

The seed is about $\frac{1}{12}$ inch (2 mm.) thick, slightly pointed at hilum; externally, reddish brown; internally, whitish, very hard, and having a

bitter, acrid taste. Both the corm and the seed of colchicum depend for their medicinal properties upon a pale yellow, amorphous, and highly toxic alkaloid, known as *colchicine*. The *United States Pharmacopœia* directs that colchicum corm should yield upon assay not less than 0.35 per cent. of *colchicine*, colchicum seed not less than 0.45 per cent. of *colchicine*.

Action and Uses.—Colchicum corm, colchicum seed, their alkaloids, and all preparations of the drugs are irritants to the skin and mucous membranes. In *overdoses*, they give rise to violent gastro-enteritis, nausea, abdominal pain, purging, tenesmus, salivation, and death from exhaustion and gastro-enteritis. In poisoning from the preparations of colchicum, the stomach should be washed out, tannic acid administered to form insoluble tannates of colchicine, opium to relieve pain, and oils to soothe the inflamed gastro-intestinal mucous membrane; hypodermic injection, stimulants, and external heat are advisable to support the circulation and respiration. The preparations of the drug and colchicine are used in the treatment of *acute gout*, and in chronic rheumatism.

Incompatibilities.—As colchicum depends for its activity upon an alkaloid, it is incompatible with all alkaloidal precipitants, such as alkali hydroxides, alkali carbonates, and bicarbonates, tannates, and most of the metallic salts. Concentrated acids and alkali hydroxides convert colchicine into colchicein.

Official Preparations

Fluidextractum Colchici Seminis (*Fluidextract of Colchicum Seed*).—Should contain 0.4 Gm. of colchicine in each 100 Cc. of the fluidextract. Made with a menstruum of Alcohol, 6 parts, and Water, 3 parts.

Dose.—0.2 to 0.4 Cc.; 3 to 6 minims.

Tinctura Colchici Seminis (*Tincture of Colchicum Seed*).—Made by percolating 10 Gm. of Colchicum Seed with a menstruum of Alcohol, 60 parts, and Water, 40 parts, to make 100 Cc., and should contain 0.04 Gm. of *colchicine* in each 100 Cc. of the tincture.

Dose.—2 to 4 Cc.; 30 to 60 minims.

Vinum Colchici Seminis (*Wine of Colchicum Seed*).—Made by mixing together 10 Cc. of Fluidextract of Colchicum Seed, 15 Cc. of Alcohol, and 75 Cc. of White Wine; set aside for two days and then filter.

Dose.—2 to 4 Cc.; 30 to 60 minims.

COLLODIUM—Collodion

Collodion is a thick, liquid preparation made by dissolving 4 Gm. of Pyroxylin in a mixture of 25 Cc. of Alcohol and 75 Cc. of Ether. It is *used* locally as a protecting impervious dressing for abrasions and cuts. When applied to the skin with a camel's-hair brush or swab, the

ether and alcohol evaporate and leave a coat of pyroxylin. Pyroxylin is insoluble in water, and a collodion dressing after drying can only be removed by the use of a solution of ether and alcohol made into the proportion of ¾ part of ether and ¼ part of alcohol. Three collodia are official.

Official Preparations

Collodium Cantharidatum (*Cantharidal Collodion*). *Synonym*, Blistering Collodion.—Made by exhausting Cantharides by percolation with Chloroform, partially evaporating, adding the evaporated residue to Flexible Collodion, and after it has thoroughly settled, pouring off the clear portion from any sediment which may have formed and transferring it to a bottle. Used as a *blistering agent.*

Collodium Flexile (*Flexible Collodion*).—Made by adding 5 Gm. of Canada Turpentine, 3 Gm. of Castor Oil, to 92 Gm. of Collodion. On account of its flexibility, this is the most suitable form of collodion for using about joints.

Collodium Stypticum (*Styptic Collodion*).—Made by introducing 20 Gm. of Tannic Acid into a bottle, adding 5 Cc. of Alcohol, 25 Cc. of Ether, agitating until the tannic acid is thoroughly incorporated and partially dissolved, and then adding enough Collodion to make 100 Cc. This preparation, in addition to its value as a protecting dressing, is styptic, and useful for controlling *small hemorrhages.*

COLOCYNTHIS—Colocynth

Family, Cucurbitaceæ.

Colocynth is the peeled, dried fruit of *Citrullus Colocynthis*, a perennial plant resembling the watermelon vine, native to southern and western Asia, northern and southern Africa in arid places, and cultivated in many subtropical countries.

The small gourd, or, more properly, the fruit deprived of its outer rind is globular, 2 to 4 inches (5 to 10 Cm.) in diameter, whitish or yellowish-white, light, spongy, separable longitudinally in 3 carpels, each containing near the outer surface whitish or light brown seeds. It has little odor, and an intensely bitter taste. In making official preparations, the seeds are rejected, the pulp alone being used. The drug depends for its purgative properties upon a glucoside known as *colocynthin*, and a resin known as *colocynthidin*.

Action and Uses.—The preparations of colocynth are employed as hydragogue cathartics. In full doses, purging is accompanied by griping pain, and for this reason it is rarely given alone, but is administered in combination with other drugs. In *poisonous doses*, the drug produces violent griping, inflammation of the bowels, and bloody discharges.

The powdered drug may be given in doses of from 0.06 to 0.32 Gm.; 1 to 5 grains, but is not as popular as the extract, and the compound extract of colocynth.

Official Preparations

Extractum Colocynthidis (*Extract of Colocynth*).—Made by exhausting the drug with Diluted Alcohol and evaporating until dry and reducing to powder.

Dose.—0.12 to 0.3 Gm.; 2 to 5 grains.

Extractum Colocynthidis Compositum (*Compound Extract of Colocynth*).—A powdered extract containing 16 Gm. of Extract of Colocynth, 50 Gm. of Purified Aloes, 14 Gm. of Resin of Scammony, 14 Gm. of Soap, and 6 Gm. of Cardamom, to make 100 Gm. of extract. The compound extract of colocynth enters into the composition of Compound Cathartic Pills, and Vegetable Cathartic Pills.

Dose.—As a hydrogogue cathartic, 0.3 to 1.3 Gm.; 5 to 20 grains.

CONIUM—Conium

Synonyms, Poison Hemlock, Spotted Hemlock. *Family*, Umbelliferæ.

The full-grown but unripe fruit of *Conium maculatum*, carefully dried and preserved, and yielding not less than 0.5 per cent. of coniine. The Hemlock plant, or weed, is native to Europe, but is naturalized and also grows in waste places and along streams in the United States.

The fruit is broadly ovoid and greenish gray, made up of 2 carpels. As commonly seen in the shops, the carpels are separated, each being about $\frac{1}{8}$ inch (3 mm.) long, and $\frac{1}{16}$ inch (1.5 mm.) in diameter, ovoid, somewhat curved, the inner flattened side marked by a deep longitudinal groove, the outer side convex with 5 pale yellow, somewhat crenate ribs. The drug is almost entirely without odor, but when triturated with solution of potassium hydroxide, a strong disagreeable and mouse-like odor develops; the pericarp is without oil-tubes. Hemlock in many respects has the appearance of Anise, but may be distinguished from it by the aromatic taste of anise and also by the fact that anise has 12 to 20 oil-tubes.

Conium depends for its activity upon a volatile alkaloidal liquid known as *coniine*, and also contains *conhydrine*, *methylconiine*, and a small quantity of fixed oil. On account of containing a volatile principle, the drug is unfit for use after being kept for two years.

Action and Uses.—Conium in medicinal doses depresses, and in toxic doses paralyzes the motor nerves; it also depresses the circulation and respiration. Conium is *used* as an antispasmodic to quiet *irritations* or *spasms* due *to* irritation of motor nerves.

Poisoning.—In poisonous or full doses, conium produces a feeling of great relaxation, loss of muscular power, staggering, internal squint,

disorder of vision, dropping of the lower jaw, feeble pulse, and death from paralysis of the motor nerves of respiration.

Treatment of Poisoning.—The treatment of poisoning consists in the use of the stomach pump, hypodermic injection of strychnine in full doses, artificial respiration, and application of external heat.

Incompatibilities.—The preparations of conium, and coniine are precipitated by potassio-mercuric iodide, tannic acid, the soluble salts of copper, zinc, and iron; they are oxidized by most oxidizing agents, and give a brown precipitate with an alcoholic solution of iodine.

Dose.—0.12 to 0.4 Gm.; 2 to 6 grains.

Official Preparation

Fluidextractum Conii (*Fluidextract of Conium*).—Made with a menstruum of Diluted Alcohol to which 2 per cent. of Acetic Acid has been added. It should contain 0.45 Gm. of coniine in 100 Cc. of the fluidextract.

Dose.—0.12 to 0.4 Cc.; 2 to 6 minims.

CONVALLARIA—Convallaria

Synonym, Lily of the Valley. *Family,* Liliaceæ.

The dried rhizome and roots of *Convallaria majalis*, a perennial, stemless herb, having slenderly running root scars, which bring forth each spring 2 oblong, bright green, smooth leaves, and flowers about May or June.

The flower is a one-sided racime of 10 bell-shaped, white, 6-lobed, sweet-scented florets. The rhizome and roots, which are official, are somewhat branched, of variable length, $\frac{1}{24}$ to $\frac{1}{8}$ inch (1 to 3 mm.) thick, cylindrically, whitish or pale brown, marked with a few circular or root scars, or thin tortuous and branched roots. It has a distinct odor, sweetish, bitter, and slightly acrid taste. Convallaria contains two glucosides, *convallamarin* and *convallarin.*

Action and Uses.—The preparations of Convallaria are used to *stimulate the heart* and regulate its rate.

Official Preparation

Fluidextractum Convallariæ (*Fluidextract of Convallaria*).—Made with a menstruum of 65 parts of alcohol and 35 parts of water.

Dose.—0.3 to 0.6 Cc.; 5 to 10 minims.

COPAIBA—Copaiba

Synonym, Balsam of Copaiba. *Family,* Leguminosæ.

Copaiba is an oleoresin derived from one or more South American species of *Copaiba.* Copaiba trees growing to a height of from

20 to 60 feet are found in Brazil, Venezuela, and Colombia. The oleoresin collects in ducts running longitudinally through the trunk of the tree, and is obtained by cutting boxes direct to the centre of the tree near the base of the trunk; into these boxes the oleoresin usually flows at once. Several varieties of the oleoresin are to be found in the market, and are valued according to the percentage of volatile oil contained in them; that most highly prized is known as Para balsam, which contains from 60 to 90 per cent. of volatile oil. The official oleoresin is a pale yellow to brownish-yellow, more or less transparent viscid liquid, having an aromatic odor, and a persistent bitter and acrid taste. It is *insoluble* in water, but is *soluble*, showing at most a slight opalescence, in absolute alcohol, carbon disulphide, petroleum benzin, and in fixed and volatile oils, and is completely soluble in chloroform and ether. Upon distillation, it yields from 40 to 60 per cent. of volatile oil, and from 10 to 60 per cent. of resin. It is sometimes adulterated with gurjun oil, paraffin oils, fixed oils, and resin.

Action and Uses.—Copaiba is a stimulant to the mucous membranes, and is employed in the second stages of specific *urethritis*, *cystitis*, *pyelitis*, and *bronchitis*. If long continued, it is apt to disorder digestion, and in some susceptible individuals produces urticaria or hives. In *overdoses*, it may inflame the kidneys and bladder, produce pain in the back, infrequent and painful urination, the urine frequently containing blood. Being insoluble in water, and of a disagreeable taste, it is best *administered* in soft capsules, or if desired it may be made into an emulsion by the use of acacia. One part of magnesium oxide, moistened with water and thoroughly triturated with 16 parts of Copaiba, slowly combines to form a solid mass, which, if desired, may be made into pills of suitable sizes.

Dose.—0.3 to 1.2 Cc.; 5 to 20 minims.

Official Derivative

Oleum Copaibæ (*Oil of Copaiba*).—A colorless, or pale-yellow liquid, having a characteristic odor of Copaiba, and a slightly bitter and pungent taste, obtained by distillation from copaiba. May be *administered* in capsules or as an emulsion.

Dose.—0.3 to 0.6 Cc.; 5 to 10 minims.

CORIANDRUM—Coriander

Family, Umbelliferæ.

The dried ripe fruit of *Coriandrum sativum*, a small annual plant, native to Italy, and growing in most parts of Europe.

The fruit of coriander is globular, about $\frac{1}{5}$ inch (5 mm.) in diameter, 10-ribbed, or if the mericarps are divided, each has 5 prominent, straight,

primary ribs and 4 distinct secondary ribs; the inner surface of each mericarp (half fruit) is deeply concave, with two oil tubes. When fresh, the fruit and all other parts of the plant have a fetid odor, but after being dried it has an agreeable aromatic odor and taste. The drug contains an aromatic volatile oil.

Action and Uses.—Coriander, and its volatile oil, which is official, is an agreeable aromatic, used rather extensively in pharmacy as a flavoring agent. The oil enters into the composition of Confection of Senna, the Compound Spirit of Orange, and the Syrup of Senna. The fruit (seed) may be used in any quantity desired.

Official Derivative

Oleum Coriandri (*Oil of Coriander*).—A colorless, or slightly yellowish volatile oil, obtained by the process of distillation from coriander. It has the characteristic, aromatic odor of coriander, and a warm, spicy taste.

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

CREOSOTUM—Creosote

Creosote is a mixture of phenols and phenol derivatives, chiefly *guaiacol* and *creosol*, obtained during the distillation of wood-tar, preferably of that derived from the beech-wood. It is an almost colorless, or yellowish, oily liquid, having a characteristic, smoky odor, and a bitter, caustic taste. It is *soluble* in 140 parts of water, and freely soluble in alcohol, ether, chloroform, acetic acid, and fixed and volatile oils. ("Coal-tar creosote" is only phenol or carbolic acid, and being a violent poison should never be employed in the place of the creosote distilled from wood-tar.) Unlike phenol or carbolic acid, creosote does not coagulate albumin nor collodion, nor is it freely soluble, nor rendered freely soluble in water by glycerin. Creosote may be further distinguished from carbolic acid or "coal-tar creosote" by dissolving a small quantity of the suspected liquid in water, and adding bromine water; creosote will give a reddish-brown precipitate, while carbolic acid or "coal-tar creosote" yields a white precipitate.

Action and Uses.—Creosote is a stimulating expectorant and gastro-intestinal antiseptic. It is employed in *subacute* and *chronic bronchitis*, in the treatment of the *bronchitis of pulmonary tuberculosis*, in *vomiting*, and in *fermentative diarrhœa*. The symptoms of *poisoning* from creosote and the treatment is practically the same as of phenol. (See Phenol.) The drug is best *administered* in soft capsules along with a few drops of olive oil, but, for patients who cannot swallow capsules, it may be given dissolved in wine, or the official creosote water may be used.

Incompatibilities.—The salts of silver, gold, copper, and iron are reduced to a metallic state by creosote; with silver oxide, potassium

permanganate, and other active oxidizers it is explosive. It precipitates solutions of gum and albumin, but not gelatin.

Dose.—0.06 to 0.6 Cc.; 1 to 10 minims.

Official Preparation

Aqua Creosoti (*Creosote Water*).—Made by dissolving 1 Cc. of Creosote in 99 Cc. of Distilled Water.

CRESOL—Cresol

Formula, $C_7H_7.OH = 107.25$.

Cresol is a mixture ($C_6H_4CH_3OH$) of the three isomeric Cresols (orthocresol, metacresol, paracresol), obtained from coal-tar, freed from phenol, hydrocarbons, and water. It is prepared from coal-tar by collecting and purifying the distillate, boiling between 140° and 220° C.

It is a colorless or straw-colored liquid, having a phenol-like odor, and turning yellowish-brown on prolonged exposure to air. It is *soluble* in 60 parts of water, and miscible in all proportions with petroleum benzin, benzene, alcohol, ether, and glycerin, and is also miscible with alkali hydroxide solutions.

Action and Uses.—Cresol is an antiseptic. It was admitted to the last pharmacopœia for making the official Compound Solution of Cresol. It is less caustic than phenol, and more slowly absorbed. The symptoms of poisoning and treatment are the same as those given under phenol.

Official Preparation

Liquor Cresolis Compositus (*Compound Solution of Cresol*).—A straw-colored liquid, having a phenol-like odor. Made by dissolving 80 Gm. of Potassium Hydroxide in 50 Gm. of Water, adding 350 Gm. of Linseed Oil, and after thoroughly mixing, adding 500 Gm. of Cresol, stirring until a clear solution is produced, and finally adding a sufficient quantity of Water to make the finished product weigh 1000 Gm. It is freely miscible with water, forming a clear, soapy solution.

Action and Uses.—Compound solution of cresol is used for making antiseptic solutions, being employed in surgical practice, it is intended to take the place of many commercial or proprietary preparations of cresol on the market. For making antiseptic or germicide solutions it may be added to water to the extent of from 1 to 3 per cent.

CUBEBA—Cubeb

Family, Piperaceæ.

The dried, unripe fruit of *Piper Cubeba*, a twining plant growing on coffee plantations in the East Indies.

Cubeb is a blackish-gray, much-wrinkled, globular fruit or berry, about $\frac{1}{6}$ to $\frac{1}{5}$ inch (4 to 5 mm.) in diameter, contracted at the base into a slender stem-like portion; within the pericarp is found a single seed; its odor and taste are strongly aromatic and somewhat camphoraceous. The medicinal properties of the drug are dependent upon a volatile oil, resin, and *cubebic acid;* it also contains *cubebin,* wax, and fats.

Action and Uses.—Cubeb is a stimulant to the mucous membranes. It is *used* in *subacute* and *chronic* stages of *specific urethritis, cystitis, bronchitis, laryngitis,* and *rhinitis.* In *overdoses,* or when too long continued, the drug may disorder digestion and irritate the kidneys and bladder. The oleoresin and resin, both of which are official, are *best given* in soft capsules.

Incompatibilities.—On account of the large quantity of resinous material in the fluidextract, it is incompatible with water.

Dose.—2 to 8 Gm.; ½ to 2 3 (10-60 gr.)

Official Preparations and Derivative

Fluidextractum Cubebæ (*Fluidextract of Cubeb*).—Made with a menstruum of alcohol.

Dose.—0.6 to 4 Cc.; 10 to 60 minims.

Oleoresina Cubebæ (*Oleoresin of Cubeb*).—Made with a menstruum of alcohol. Upon standing for some time, it deposits a waxy and crystalline matter, which should be rejected, the liquid portion only being used.

Dose.—0.3 to 1.2 Cc.; 5 to 20 minims.

Oleum Cubebæ (*Oil of Cubeb*).—A volatile oil distilled from Cubeb.

Dose.—0.3 to 1 Cc.; 5 to 15 minims.

Trochisci Cubebæ (*Troches of Cubeb*).—Each troche contains 0.002 Gm., $\frac{1}{3}$ grain of Oleoresin of Cubeb, along with Extract of Glycyrrhiza, Acacia, Syrup of Tolu, and Oil of Sassafras.

Dose.—From 1 to 6 daily.

CUPRI SULPHAS—Copper Sulphate

Synonym, Blue Stone. *Formula,* $CuSO_4 + 5H_2O = 247.85$.

Large, transparent, deep blue, triclinic crystals, having a nauseous, metallic, astringent taste, and slowly efflorescent in dry air. It is *soluble* in about 2.2 parts of water, 400 parts of alcohol, and 3.5 parts of glycerin. When heated, it effloresces and crumbles into a pale blue, amorphous powder. Its aqueous solution has an acid reaction on litmus paper.

Action and Uses.—Copper sulphate is an astringent, emetic, and caustic. As an astringent, it is sometimes applied locally to control oozing hemorrhages, and administered in *internal hemorrhage* of the

stomach or bowels, and in the treatment of *serous diarrhœa*. In diluted solution, it is sometimes employed as a gargle in *fetid sore throat*, and as a mouth wash in *stomatitis*. The crystals are to cauterize *cancer sores*, *ulcerative stomatitis*, and *venereal sores*.

Poisoning.—Copper sulphate in poisonous doses is a violent gastro-intestinal irritant, producing vomiting, purging, severe abdominal pain, exhaustion, and collapse. The *treatment of poisoning* consists in administering the chemical antidote *potassium ferricyanide*, known as *yellow prussiate of potash*, the use of the stomach pump, administering mucilaginous drinks, milk, and oil to protect the mucous membrane, and, in cases of profound exhaustion and depression, applying external heat and administering stimulants.

Incompatibilities.—Copper is precipitated from aqueous solution by ammonia water, ammonium carbonate, its precipitate becoming redissolved upon the addition of an excess of either one of these; it is also precipitated by fixed alkali hydroxides, carbonates, alkali carbonates, sulphides, phosphates, soluble iodides, and by arsenites in neutral solution. In alkaline solutions, it is reduced to cuprous oxides by glucose, the reaction being hastened by boiling.

Dose.—As emetic, 0.2 to 0.3 Gm.; 3 to 5 grains. As astringent, 0.003 to 0.006 Gm.; $\frac{1}{20}$ to $\frac{1}{10}$ grain.

CUSSO—Kousso

Family, Rosaceæ.

The dried panicles of the pistillate flowers of *Hagenia abyssinica*, a tree growing upon the high table lands of Abyssinia.

Kousso comes into the market in rolls, or compressed bundles, from 10 to 15 inches (25 to 40 Cm.) long, reddish-brown, each branch rising from the angle of the sheathing bract, and each flower furnished at its base with 2 rounded bracts; it has a slight odor and a bitter taste. Kousso contains a bitter resinous principle, *tannin*, volatile oil, and sugar.

Action and Uses.—The infusion made from the drug is used to cause the expulsion of *tapeworms*.

Dose.—15 Gm.; $\frac{1}{2}$ ounce in infusion.

CYPRIPEDIUM—Cypripedium

Synonym, Lady's Slipper. *Family*, Orchidaceæ.

Cypripedium is the dried rhizome and roots of *Cypripedium hirsutum* or *Cypripedium parviflorum*, a small plant growing throughout the United States. It takes its synonym from the shape of the flower, which resembles a miniature Indian moccasin. The rhizome or horizontal growth, which is official, is curved, 1 to 4 inches (3 to 10 cm.)

long, $\frac{1}{12}$ to $\frac{1}{4}$ inch (2 to 6 mm.) thick, orange-brown or dark brown, the upper side beset with numerous saucer-shaped scars closely covered below with simple wiry roots. It has a distinct, heavy, valerian-like odor, and a sweetish, bitter, and somewhat pungent taste.

Action and Uses.—Cypripedium is a mild sedative to the nervous system, antispasmodic, and is *used* in the treatment of *hypochondriasis*, *melancholia*, and *neurasthenia*.

Dose.—0.3 to 2 Gm.; 5 to 30 grains.

Official Preparation

Fluidextractum Cypripedii (*Fluidextract of Cypripedium*).—Made with a menstruum of diluted alcohol.

Dose.—0.3 to 2 Cc.; 5 to 30 minims.

DIGITALIS—Digitalis

Synonym, Fox-glove. *Family*, Scrophulariaceæ.

The dried leaves of *Digitalis purpurea*, collected from plants of the second year's growth at the commencement of flowering. The digitalis herb grows wild in southern and central Europe, and is cultivated in England as an ornament and on account of its medicinal value. It has a biennial or perennial fibrous root, which in its first year of growth sends up large tufted leaves, and in the following year a single, erect, downy, leafy stem, rising to a height of from two to five feet, and terminating in a spike of purple flowers. The plant takes its name from the color and shape of the flower, which is blue, and tubular, or like a finger of a glove (Digitalis pertaining to the finger, purpurea, purple color; Fox-glove, a contraction of folks-glove, Folks synonym of Faries).

The leaves of the second year's growth are ovate or oval, from 4 to 12 inches (10 to 30 Cm.) long, 2 to 6 inches (5 to 15 Cm.) broad, and roughly contracted into winged petioles. They are thin, dull, and rather pale-green or grayish underneath; upper surfaces wrinkled, sparsely hairy; lower surfaces densely and finely hairy, the venations conspicuously reticulated, margins crenate; the midribs and principal veins broad and flat, usually purplish; the lower veins continued into the wings of the petiole; odor slight, characteristic; taste tea-like, bitter. The drug is usually in more or less crumpled and broken fragments. The best digitalis is that carefully selected and dried from the plants of the second year's growth, growing wild in Germany, and also the English digitalis, which is cultivated and carefully selected and dried. Digitalis grown in the United States is not physiologically active. The leaves contain a number of active principles, some soluble in water, some soluble in alcohol, and some soluble in both alcohol and water; no single principle of the drug, however, represents its full physiological and therapeutic properties. The best preparations are

those in which the menstruum used for exhausting the leaves is a mixture of alcohol and water.

By reason of the difference in the solubility of the active principles in water and in alcohol, there will be a variation in the effects obtained from the use of the infusion made with water, and of the tincture, fluidextract, and extract in which the menstruum used for exhausting the drug is a mixture of alcohol and water. This probably will be more clearly understood when we consider the physiological action of the active principles of digitalis. *Digitalin* is a stimulant to the heart, to the pneumogastric nerves, to the vasomotor system; is only slightly soluble in water, but readily soluble in alcohol; *digitalein* is a heart stimulant and a stimulant to the vasomotor system, is soluble in water, readily soluble in alcohol; *digitoxin,* a heart stimulant and a stimulant to the vasomotor system, is very sparingly soluble in water and alcohol; *digitonin,* a depressant to the heart and pneumogastric nerves, is soluble in water, and scarcely soluble in alcohol. When taken by the mouth, digitalis preparations take effect slowly, but continue their influence for at least eight hours, and are, therefore, not suitable for administering at frequent intervals in full medicinal doses.

Action and Uses.—Digitalis is a stimulant to the heart muscle, thereby increasing the force and volume of the pulse; it stimulates the vasomotor system, thereby contracting the bloodvessels and raising arterial tension; it stimulates the pneumogastric nerves, and thereby lessens the frequency of the heart's action, its diastole being prolonged; through its stimulating action, and also by increasing the quantity of blood in the coronary vessels, the nutrition of the heart improves under the remedy. Owing to its action upon the circulation, the drug is a diuretic of much value. Digitalis and its preparations is our most valuable cardiac stimulant when the organ fails to do its proper amount of work, particularly in *cardiac dilatation* and *mitral regurgitation.* It is also valuable as a heart stimulant in *pneumonia* and *exhausting fevers,* when a feeble heart needs stimulating. It is a drug of considerable power, and much used as a diuretic in *renal congestion,* but inasmuch as all preparations of digitalis are eliminated rather slowly, unless there is an increase in urinary flow, insuring its elimination within a reasonable time after beginning the remedy, it should be withdrawn, as poisonous symptoms may develop.

Poisonous Action.—In toxic doses, digitalis produces marked cardiac irregularity, the heart fluttering within the chest, now beating with great force, now interrupted, now prolonged; the arteries under the circumstances are not properly filled with blood, and the radial pulse becomes very irregular as to time, tension, and volume. Patients under the full influence of digitalis should *not arise from bed suddenly* to assume an erect position, as numerous deaths have followed a sudden change from a recumbent to an upright posture. Poisonous symptoms may follow not only from single overdoses of digitalis, but may come on with great suddenness from medicinal doses taken at brief inter-

vals. It is one of the drugs said to have a cumulative action, but in reality is cumulative only when repeated doses follow each other at too frequent intervals.

Incompatibilities.—The active principles of digitalis are rather unstable, and are precipitated by tannic acid, and decomposed by strong mineral acids and alkali hydroxides. Tincture of ferric chloride with the liquid preparations of digitalis forms a black precipitate, but does not interfere with the physiological action of the drug.

Dose.—0.06 to 0.12 Gm.; 1 to 2 grains.

Official Preparations

Extractum Digitalis (*Extract of Digitalis*).—Made by evaporating Fluidextract of Digitalis to a pilular consistency.

Dose.—0.01 to 0.016 Gm.; $\frac{1}{6}$ to $\frac{1}{4}$ grain, at intervals of from six to eight hours.

Fluidextractum Digitalis (*Fluidextract of Digitalis*).—Made with a menstruum of Diluted Alcohol.

Dose.—0.06 to 0.12 Cc.; 1 to 2 minims, at intervals of from six to eight hours.

Tinctura Digitalis (*Tincture of Digitalis*).—Made by percolating 10 Gm. of Digitalis with Diluted Alcohol.

Dose.—0.03 to 1.2 Cc.; 5 to 20 minims, at intervals of from six to eight hours.

Infusum Digitalis (*Infusion of Digitalis*).—Made by pouring 500 Cc. of Boiling Water upon 15 Gm. of Digitalis, macerating for two hours, straining, and adding 150 Cc. of Cinnamon Water to give an agreeable taste, 100 Cc. of Alcohol as a preservative, and lastly, enough Water to make 1000 Cc. of infusion.

Dose.—8 to 16 Cc.; 2 to 4 f℥, at intervals of from six to eight hours.

ELATERINUM—Elaterin

Family, Cucurbitaceæ.

A neutral principle obtained from Elaterium, a substance deposited by the juice of the fruit of *Ecballium Elaterium*. The fruit of Ecballium, known as *squirting cucumber,* is native to western Asia, northern Africa, and southern Europe.

It is a common perennial weed, with a trailing, succulent, brittle stem, from 2 to 4 feet long. The fruit is about 2 inches (50 mm.) long, and 1 inch (25 mm.) thick, oblong, pale yellowish-green, beset with prickles. When the fruit ripens and falls from its attachment, at the instant of separation from the vine its contents are suddenly expelled, and from this peculiarity the plant receives its synonym, "squirting cucumber." To obtain *elaterium,* the fruit is cut into slices, placed upon a sieve, and the juices or fluid exuding from it collected. Within a few

hours this fluid deposits a sediment, which, when collected and dried, is light, pulverulent, and of a yellowish-white color, and is known as *elaterium*. *Elaterin* is obtained by partially evaporating an alcoholic tincture of *elaterium*, and throwing the residue, while yet warm, into a weak boiling solution of potassium hydroxide; upon cooling, elaterin crystallizes out of solution and is collected and dried. Elaterin occurs in white hexagonal scales or prismatic crystals, without odor, having a slightly acrid, bitter taste; it is *insoluble* in water, *soluble* in 262 parts of alcohol. Its solutions are neutral to litmus paper.

Action and Uses.—Elaterin is a most powerful hydragogue cathartic, producing profuse water evacuation, with much prostration. In *overdoses*, it gives rise to violent gastro-enteritis. The drug is not employed for the relief of constipation, but as a hydragogue cathartic in the treatment of *dropsy, local effusions*, such as *pericarditis* and *pleurisy*, in *cerebral congestion*, and in *uremia*, and similar conditions in which it is necessary to drain the blood of water or toxins, or of both, by violent purging.

Dose.—0.003 to 0.006 Gm.; $\frac{1}{20}$ to $\frac{1}{10}$ grain.

Official Preparation

Trituratio Elaterini (*Trituration of Elaterin*).—Made by triturating 10 parts of Elaterin with 90 parts of Sugar of Milk.

Dose.—0.03 to 0.06 Gm.; $\frac{1}{2}$ to 1 grain.

ERGOTA—Ergot

Ergot is the sclerotium (compact mycelium or spawn) of *Claviceps purpurea* (a parasitic fungus), replacing the grain of rye (Secale cereale). It should be moderately dried, and not exposed to damp atmosphere. After being kept more than one year it is unfit for use. Ergot is native to Russia, where it frequently renders the rye crops unfit for food, and is cultivated in Spain, Germany, and France.

The blossoms of rye becoming infected by the spores or reproductive cells of Claviceps purpurea (a mould or fungus growth), do not produce the rye grain, but, in its stead, develop ergot. The first stage of development is characterized by the penetration of filaments or threads of the fungus into ovaries of the blossoms, forming hyphæ, or interwoven masses; this is followed by the second stage of development, in which the hyphæ unite at the fundus of the ovaries into a compact, purplish-black mass, which grows upward to form the sclerotium (which is a thick mass of hyphæ felted together), constituting a resting stage in the development of some fungi, and acting as a store or reserve material, and constitute in this case the ergot of commerce. The second stage does not represent the final development of the fungus, but is a resting stage. The third stage of the development of the fungus is of interest

only in so far as it points out the means by which the fungus is propagated. This stage usually does not begin until about nine to ten months after the second stage has been completed. It is characterized by the formation of small spherical excrescences, the size of a pinhead; these contain the orifices or cavities containing spore sacs, each sac containing eight filiform spores. Under ordinary circumstances, the third stage reaches full development, with elimination of the spores, about the time another crop of rye is blooming, and the spores, finding lodgement in the blossoms, infect them, and a new crop of ergot is produced. In the last stage of development, the ergot heads, masses, or grains are exhausted of oil and other constituents of the masses by the fruiting fungus, and the sclerotium becomes shrivelled and worthless.

Ergot is subcylindrical, obscurely three-angled, tapering toward both ends, somewhat curved, about $\frac{3}{5}$ to $1\frac{1}{5}$ inches (1.5 to 3 Cm.) long, and about $\frac{1}{8}$ inch (3 mm.) thick; externally purplish-black, internally pinkish or reddish-white; odor peculiar, heavy, increased by trituration with solution of potassium hydroxide; taste disagreeable. It contains a fixed and a volatile oil, which becomes rancid upon long keeping or exposure.

The chemistry of Ergot is obscure, investigators being unable to agree upon the nature of its active principles. *Ergotine, sclerotic acid, sphacelic acid, cornutine,* and *schmelinic acid* are principles separated by different chemists; no one of these so-called active principles represent the physiological or therapeutic properties of the drug, and should not be employed as a substitute for the official preparations of it. There is no reliable process by which ergot may be assayed, but careful manufacturers subject the drug to *physiological tests.* To prevent its fixed oil from becoming rancid, the drug is carefully desiccated, placed in glass-stoppered bottles, and a small quantity of chloroform added as a preservative. The drug is easily injured by careless desiccation, and is also often destroyed by insects. To be therapeutically active, it requires careful selection and preservation. After being kept for one year, even if carefully selected and preserved, it is no longer fit for use.

Action and Uses.—Ergot, when given by the mouth or hypodermically, is a stimulant to the heart, to the vasomotor centres, and to the muscular coats of the bloodvessels, and thereby raises arterial tension. It stimulates the muscular fibers of the uterus, and centres in the lumbar portion of the spinal cord, causing contraction of the uterus. It is *used* to control excessive *hemorrhage from the uterus* after labor, and *other remote hemorrhages,* and to relieve *hypostatic, pulmonary,* and other *congestions.*

Acute Poisoning.—In poisonous overdoses, ergot produces restlessness, headache, delirium, circulatory depression, nausea, and vomiting.

Chronic Poisoning.—Chronic poisoning by ergot is characterized by spastic contractions and gangrene of the extremities.

Official Preparations

Extractum Ergotæ (*Extract of Ergot*).—A soft extract made by a process whereby each grain represents about eight grains of ergot.

Briefly stated, the extract is prepared by exhausting powdered ergot with a menstruum of alcohol and water, partially evaporated, adding water, and filtering. Diluted hydrochloric acid is then added to precipitate sclererythrin, the coloring matter of ergot, and the liquid is again filtered, treated with monohydrated sodium carbonate to neutralize the acid, a small quantity of glycerin added as a preservative, and lastly evaporated to the proper weight. On account of the glycerin in the extract, it is difficult to prepare pills from it that will not soften and cohere. The extract is best *prescribed* in capsules.

Dose.—0.06 to 0.6 Gm.; 1 to 10 grains.

Fluidextractum Ergotæ (*Fluidextract of Ergot*).—Made with a menstruum of Diluted Alcohol.

Dose.—2 to 4 Cc.; ½ to 1 f℥.

Vinum Ergotæ (*Wine of Ergot*).—Made by mixing together 200 Cc. of Fluidextract of Ergot, 50 Cc. of Alcohol, and 750 Cc. of White Wine.

Dose.—4 to 16 Cc.; 1 to 4 f℥.

ERIODICTYON—Eriodictyon

Synonym, Yerba Santa. *Family*, Hydrophyllaceæ.

The dried leaves of *Eriodictyon californicum*, an evergreen shrub from 3 to 5 feet (1 to 1.5 M.) high, growing upon and among rocks, on hills or mountains in California and northern Mexico. The leaves are oblong-lanceolate, 2 to 6 inches (50 to 150 mm.) broad, acute at the apex, narrowed below into a short, broad petiole, entire or irregularly serrate, or crenate-dentate; upper surface yellowish-green, smooth, and covered with a brownish resin; lower surface whitish or yellowish-white, reticulated, and covered with matted hairs; odor somewhat aromatic; taste balsamic and sweetish. The drug contains an abundance of resin, and some volatile oil.

Action and Uses.—Eriodictyon is a feeble expectorant, and a mild stimulant to digestion. It is *used* in *subacute bronchitis*, *asthma*, and *chronic gastric catarrh*. Preparations of the drug, particularly a syrup made from it, are used to *disguise the taste of quinine*. The fluidextract and other liquid preparations of eriodictyon contain such a large percentage of resin that they are almost instantly precipitated by water or aqueous solutions.

Dose.—1 to 2 Gm.; 15 to 30 grains.

Official Preparation

Fluidextractum Eriodictyi (*Fluidextract of Eriodictyon*).—Prepared by the usual method of making fluidextracts, the menstruum for

macerating and percolating being in the proportion of Alcohol, 4 parts; Water, 1 part.

Dose.—1 to 2 Cc.; 15 to 30 minims.

EUCALYPTOL—Eucalyptol

Synonym, Cineol. *Formula,* $C_{10}H_{18}O$ = 152.98.

An organic oxide obtained from the volatile *Oil of Eucalyptus,* and from some other volatile oil.

A colorless liquid, having a characteristic, aromatic, and distinctly camphoraceous odor, and a pungent, spicy, and cooling taste. *Soluble* in all proportions of alcohol. Used for the same purposes as oil of eucalyptus.

Dose.—0.2 to 0.6 Cc.; 3 to 10 minims.

EUCALYPTUS—Eucalyptus

Family, Myrtaceæ.

The dried leaves of *Eucalyptus Globulus,* collected from the older parts of the tree. The Eucalyptus tree, also known as Blue Gum, is a rapid-growing tree, within six years reaching the height of 50 feet, and ultimately reaching the height of 200 to 300 feet, with a trunk diameter of from 10 to 20 feet. It is native to Australia, is cultivated in subtropical countries, and thrives well in the United States, in the States of California and Florida.

The leaves are shortly and stoutly petioled, very large, from 6 to 12 inches (15 to 30 cm.) long, and $\frac{3}{4}$ to $1\frac{1}{2}$ inches (2 to 4 cm.) broad, lanceolately scythe-shaped, rounded, or very abruptly contracted at the oblique base, tapering regularly to the summit, entire, very thick and coriaceous, smooth, of a dull pale green, pellucid-punctate; venation inconspicuous, anastomosing near the entire margin; odor aromatic, somewhat camphoraceous; taste aromatic, bitter, and cooling. In tropical and warm countries, the trees are grown for their valuable timber, and, in malarial regions, to dry the soil and purify the atmosphere. Several reasons have been advanced to account for its value in rendering malarial districts non-malarial; the abundant foliage of the tree is supposed to act as a wind shield, preventing, to a certain degree, malarial-carrying mosquitoes from being blown by winds from the marshes to the residences of inhabitants. Another theory is that the soil and atmosphere become charged with the antiseptic constituents of the leaves and bark, and thereby prevent malaria. A third, and probably the correct theory of the value of Eucalyptus forests, is that the abundant foliage, rapidly evaporating moisture taken from the soil, drys the marshes and renders the locality unfit for the propagation of mosquitoes. The leaves from the Australian trees are undoubtedly

of greater value than leaves collected in California, as they contain a much larger percentage of the volatile oil. It is probable that most of the leaves of the Eucalyptus used in this country are obtained from the latter source. Eucalyptus leaves contain about 6 per cent. of volatile oil, composed largely of *eucalyptol*, and acid, crystallizable resins, *tannin*, and *cerylic alcohol*.

Action and Uses.—Eucalyptus and its preparations, when administered internally, produce a sensation of warmth, are antispasmodic, carminative, sedative, and mildly diuretic. They are *used* internally in the treatment of *malaria*, *bronchitis*, and *asthma*. Oil of eucalyptus and eucalyptol, in addition to being used for the purposes stated above, are used locally upon the skin and mucous membrane as an antiseptic and sedative.

Official Preparation and Derivative

Fluidextractum Eucalypti (*Fluidextract of Eucalyptus*).—Made with a menstruum of Alcohol, 3 parts, and Water, 1 part.

Dose.—0.6 to 4 Cc.; 10 to 60 minims.

Oleum Eucalypti (*Oil of Eucalyptus*).—A colorless or pale-yellow volatile oil, having a characteristic, aromatic, somewhat camphoraceous odor, and a pungent, spicy, and cooling taste, distilled from the fresh leaves of Eucalyptus, and yielding not less than 50 per cent. cineol (eucalyptol).

Dose.—0.3 to 1 Cc.; 5 to 15 minims.

EUGENOL—Eugenol

Formula, $C_{10}H_{12}O_2 = 162.86$.

Eugenol is a colorless, or pale-yellow, thin liquid, having a strongly aromatic odor of cloves, and a pungent and spicy taste, obtained from *oil of cloves* and other sources. It is *miscible* with alcohol in all proportions. Eugenol is used for the same purposes and in the same doses as the Oil of Cloves.

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

EUONYMUS—Euonymus

Synonym, Wahoo. *Family*, Celastraceæ.

The bark of *Euonymus atropurpureus*, a shrub growing in shady places in the United States, from Ontario to Florida, east of the Mississippi.

The bark is seen in the shops in quilled or curved pieces $1\frac{1}{8}$ to $2\frac{1}{4}$ inches (3 to 7 cm.) long, and $\frac{1}{12}$ to $\frac{1}{5}$ (2 to 5 mm.) thick; outer surface ashy or pale brownish-gray, covered with small, dark, scaly patches

of soft cork; inner surface whitish or light-brown, smooth; odor distinct; taste, sweetish. It contains a bitter principle, *euonymin*, and a mixture of several resins. Euonymin is a dark yellowish substance, consisting largely of resin and fixed oil, obtained by pouring a concentrated tincture or the fluidextract of the drug into water, and collecting and drying the precipitate.

Action and Uses.—Euonymus and its preparations possess mild cathartic and cholagogue properties, and are *used* in the treatment of *hepatic torpor*.

Official Preparations

Extractum Euonymi (*Extract of Euonymus*).—A dry powdered extract made by evaporating 100 Cc. of Fluidextract of Euonymus to dryness, powdering, and adding enough Powdered Glycyrrhiza to make 25 Gm. of extract. Each grain represents four grains of euonymus.

Dose.—0.2 to 0.6 Gm.; 3 to 10 grains.

Fluidextractum Euonymi (*Fluidextract of Euonymus*).—Made with a menstruum of 4 parts of alcohol, and 1 part of water.

Dose.—0.3 to 1 Cc.; 5 to 15 minims.

EUPATORIUM—Eupatorium

Synonym, Boneset, Thoroughwort. *Family*, Compositæ.

The dried leaves and flowering tops of *Eupatorium perfoliatum*, a hairy perennial plant, growing to a height of from 2 to 4 feet in North America, in damp, swampy places.

The leaves are opposite, the pair united at the base, from $3\frac{1}{2}$ to 8 inches (8 to 20 cm.) long, and $\frac{3}{5}$ to 2 inches (1.5 to 5 cm.) broad, tapering from near the base to an acute apex; the margins are crenate-serrate; its upper surface is rough and bright green, and its lower surface is yellowish-gray-green and resinous-dotted; the flower heads are small, numerous, corymbed, with a campulate involucre of lance-linear, imbricated scales, and with from ten to fifteen tubular, yellowish-white florets. As commonly seen, the drug is in fragments. Its odor is faintly aromatic, and its taste strongly bitter.

Action and Uses.—Eupatorium is a popular domestic remedy, *used* as a *bitter tonic*. Teas made from it are used as diaphoretics and diuretics.

Official Preparation

Fluidextractum Eupatorii (*Fluidextract of Eupatorium*).—Made with a menstruum of Diluted Alcohol.

Dose.—2 to 4 Cc.; $\frac{1}{2}$ to 1 f$\mathfrak{Z}$.

FEL BOVIS—Oxgall

The fresh bile from the ox, *Bos taurus*. Oxgall is used for preparing Purified Oxgall.

Official Preparation

Fel Bovis Purificatum (*Purified Oxgall*).—Purified oxgall is a yellowish-green, soft solid, having a peculiar odor, and a partly sweet and bitter taste; neutral or faintly alkaline in reaction; freely *soluble* in water and alcohol. It is prepared by partially evaporating oxgall, mixing with alcohol, and after three days decanting and filtering to separate all insoluble matter, the liquid portion is then evaporated to a pilular consistency.

The chief constituents of this complex substance are *sodium glycocholate, sodium taurocholate*, bile pigment, chiefly *bilirubin, bilivirdin, bilifuscin*, and *biliprasin*. In addition, it contains *cholesterin, choline, urea*, and some inorganic salts.

Action and Uses.—Oxgall assists in the emulsification and absorption of fats, retards decomposition, and stimulates the secretory activity of the liver. It is administered internally in cases characterized by the deficiency of biliary secretion. The well-known tendency of bile to toughen albuminoids suggests that it should not be administered while the meal is undergoing gastric digestion, but should be given after gastric digestion has been completed. It may be *dispensed* in pills or capsules. Locally applied, bile is used to promote healing of troublesome and foul *ulcers*.

Dose.—0.3 to 2 Gm.; 5 to 30 grains.

FERRUM—Iron

Iron is widely distributed in nature, being an important constituent of many mineral and vegetable substances, and of the blood. The number of its official preparations are greatly in excess of the needs of physicians.

Action and Uses.—In anemia showing a reduction in hemoglobin, iron improves the quality of the red blood, and is of value also in cases showing a deficiency in the number of red blood corpuscles. Several of the preparations of iron, notably the tincture of ferric chloride and the solution of iron and ammonium acetate, are diuretics, and are extensively employed in the treatment of *Bright's disease*. The preparations containing ferrous iodide possess the combined properties of a tonic and an alterative, and are used in the treatment of *strumous conditions*, complicated by *otorrhœa, conjunctivitis, nasal catarrh, glandular swelling*, and *anemia*. The astringent preparations of iron, in addition to their use as hematics, are successfully employed in the treatment of *diarrhœa*, and as local applications to control *bleeding*.

All salts and preparations of iron are more or less astringent, and, when taken internally, produce constipation, which, if not corrected, is followed by headache. The *most astringent* are solution of ferric subsulphate, solution of ferric sulphate, solution of ferric chloride, tincture of ferric chloride, all of which are ferric compounds, and also ferrous sulphate. The *least astringent* of all of its official preparations is reduced iron, and after this, preparations containing ferrous carbonate and the various scale salts.

Incompatibilities.—Tannic acid darkens and precipitates solutions containing iron; gallic acid throws down a precipitate from ferric salts and a white precipitate, turning dark, with ferrous salts; preparations of ammonia, solution of potassium hydroxide, solution of sodium hydroxide, and lime water throw down a reddish-brown precipitate of ferric hydroxide from a solution of ferric salts, and a white precipitate of ferric hydroxide, turning dark, with pure ferrous salts; alkali carbonates precipitate reddish-brown ferric hydroxide from ferric solutions, and a whitish precipitate of ferrous carbonates with ferrous salts. Arsenites and arsenates give a precipitate with both ferrous and ferric salts; mucilage of acacia is gelatinized by ferric salts; acacia slowly oxidizes ferrous salts in solution, precipitating ferric oxide.

Official Salts and Preparations

Ferrum (*Iron*). *Symbol*, Fe = 55.5.—Metallic iron, in the form of fine, bright, non-elastic wire, is used in the manufacture of the Syrup of Ferrous Iodide.

Ferrum Reductum (*Reduced Iron*). *Synonym*, Iron by Hydrogen, Quevenne's Iron.—A very fine, grayish-black, lusterless powder, without odor or taste; *insoluble* in water and alcohol. Manufactured from freshly prepared ferric hydroxide placed in a strong glass cylinder and heated to redness, while a stream of hydrogen passes through it. Being least soluble in the gastro-intestinal juices, it is less astringent and less constipating than any other salt or preparation of iron. Reduced iron is used in the treatment of anemia, and is best *prescribed* in the form of pills, powders, or troches.

Dose.—0.03 to 0.3 Gm.; ½ to 5 grains.

Official Acetate

Liquor Ferri et Ammonii Acetatis (*Solution of Iron and Ammonium Acetate*). *Synonym*, Basham's Mixture.—A clear, transparent, reddish-brown liquid, having a slightly acetous and aromatic odor, and an agreeable, slightly astringent, aromatic taste; made by mixing, in the following order, 500 Cc. of Solution of Ammonium Acetate (which shall not be alkaline), 60 Cc. of Diluted Acetic Acid, 40 Cc. of Tincture of Ferric Chloride, 120 Cc. of Aromatic Elixir, 120 Cc. of Glycerin, and enough Water to make the product measure 1000 Cc. As now prepared,

the solution is about twice as strong in iron as that of the Pharmacopœia of 1890. The solution should be freshly made when wanted. Basham's Mixture is extensively employed as a diuretic and hematic in the treatment of *chronic Bright's disease.*

Dose.—4 to 16 Cc.; 1 to 4 f℥.

Official Carbonates

Several preparations of *ferrous* carbonate are official, all being combined with sugar, syrup, or honey to retard oxidization upon exposure; ferrous carbonate oxidizes rapidly in damp air, and slowly in dry air, the process being retarded or prevented by combining it as soon as prepared with the substance named above. Being very sparingly soluble, ferrous carbonate is only mildly astringent, and less constipating than most of the preparations of iron. The official preparations are Saccharated Ferrous Carbonate, Mass of Ferrous Carbonate, Compound Iron Mixture, and Pills of Ferrous Carbonate.

Ferri Carbonas Saccharatus (*Saccharated Ferrous Carbonate*).—A greenish-brown powder, gradually becoming oxidized with air; without odor, and having at first a sweetish, afterward a slightly ferruginous taste, containing not less than 15 per cent. of *ferrous* carbonate ($FeCO_3$). It is made by adding a hot solution of ferrous sulphate to a hot solution of sodium bicarbonate, washing the resulting precipitate with hot distilled water, mixing it with sugar in fine powder, and evaporating to dryness. To prevent oxidization, the powder should be kept in small, well-stoppered bottles.

Dose.—0.2 to 0.6 Gm.; 3 to 10 grains.

Massa Ferri Carbonatis (*Mass of Ferrous Carbonate*). *Synonym,* Vallet's Mass.—A soft solid, of about a pilular consistency, only partially soluble in water; of a light gray or greenish color, without odor, and a feebly astringent, ferruginous taste. Made by thoroughly mixing freshly precipitated *ferrous* carbonate with honey and sugar, and evaporating the mixture in a tared dish. The mass contains about 35 per cent. of *ferrous* carbonate. Vallet's mass is one of the least astringent preparations of iron, and is less likely to disturb digestion or constipate than the more astringent preparations. It is used in the treatment of *anemia* and is suitable for *administering* in pill form.

Dose.—0.06 to 0.3 Gm.; 1 to 5 grains.

Mistura Ferri Composita (*Compound Iron Mixture*). *Synonym,* Griffith's Mixture.—An opaque, greenish liquid, having an agreeable odor, a slightly sweet and ferruginous taste; upon standing, it throws down a precipitate, which is again readily suspended by shaking. It is made by rubbing 1.8 Gm. of Myrrh, 1.8 Gm. of Sugar, and 0.8 Gm. of Potassium Carbonate in a mortar, with 70 Cc. of Rose Water gradually added, so that a uniform mixture may result. Transfer this to a graduated vessel, add 6 Cc. of Spirit of Lavender, then 0.6 Gm. of Ferrous Sulphate previously dissolved in 5 Cc. of Rose Water, and lastly enough

Rose Water to make the mixture measure 100 Cc. On account of its tendency to decompose, the mixture should be freshly made when needed.

The mixture is *used* in the treatment of *anemia*, and *amenorrhœa* due to anemia.

Dose.—4 to 16 Cc.; 1 to 4 f℥.

Pilulæ Ferri Carbonatis (*Pills of Ferrous Carbonate*). *Synonym*, Blaud's Pills.—Pills containing about 1 grain of freshly prepared Ferrous Carbonate, along with a small quantity of Sugar used to retard oxidation, and Powdered Tragacanth, Althea, and Water to form the mass. As the ferrous carbonate in the pills undergoes oxidation upon keeping, the pills should either be freshly made when wanted, or coated with some impervious material.

Used in the treatment of *anemia*.

Dose.—1 to 3 pills.

Official Citrates

Five scale salts and a liquid preparation containing ferric citrate are official, and well illustrate the oft repeated assertion that there are a multiplicity of ferruginous compounds. Iron and ammonium citrate possess no particular advantage over ferric citrate; soluble iron and quinine citrate differs from iron and quinine citrate only in being somewhat more soluble; while the action of iron and strychnine citrate may be readily obtained by combining strychnine with a number of other ferrous compounds. The whole number might be advantageously reduced to ferric citrate, and soluble iron and quinine citrate.

Ferri Citras (*Ferric Citrate*).—Thin, transparent, garnet-red scales, without odor, and having a slightly ferruginous taste. Slowly but completely *soluble* in water at 25° C. (77° F.), readily soluble in hot water, its solubility diminishing with age; insoluble in alcohol. Aqueous solutions show an acid reaction with blue litmus paper. It is made by heating together freshly precipitated Ferric Hydroxide and Citric Acid in a water bath until they liquefy, after which the solution is filtered and evaporated, at a moderate heat, to a syrupy consistency, and spread in a thin layer on plates of glass to dry. The sheets are then broken into scales. The scales should contain ferric citrate, corresponding to an amount of not less than 16 per cent. of metallic iron. This is one of the less astringent preparations of iron, and is less likely to induce constipation and disorder digestion than many other compounds of iron.

Dose.—0.12 to 0.3 Gm.; 2 to 5 grains.

Ferri et Ammonii Citras (*Iron and Ammonium Citrate*).—Thin, transparent, garnet-red scales, having a saline, mildly ferruginous taste; deliquescent in moist air. Readily and completely *soluble* in water, but insoluble in alcohol; an aqueous solution of the salt is neutral to litmus paper. The scales may be prepared by adding Ammonia

Water in slight excess to a solution of Ferric Citrate, evaporating at a moderate temperature to the consistency of syrup, and spreading it upon plates of glass, in a dry, warm place, so that when dry the salt may be collected in scales. The scales should contain iron and ammonium citrate, corresponding in amount to not less than 16 per cent. of metallic iron. It is used for the same purposes and under the same conditions as ferric citrate, being somewhat more soluble than that substance.

Vinum Ferri (*Wine of Iron*).—Made by dissolving 4 Gm. of Iron and Ammonium Citrate in 70 Cc. of White Wine, adding 6 Cc. of Tincture of Sweet Orange Peel, 10 Cc. of Syrup, and enough White Wine to make the product measure 100 Cc. The mixture should be set aside for two days, then filter through paper in a well-covered funnel.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Ferri et Quininæ Citras (*Iron and Quinine Citrate*).—Thin, transparent scales, of a reddish-brown color, having a bitter, mildly ferruginous taste; slowly deliquescent upon exposure, slowly but completely *soluble* in cold water, more readily in hot, and partially soluble in alcohol; its solubility is diminished by age. It should contain not less than 11.5 per cent. of dried quinine and ferric citrate, corresponding to not less than 13.5 per cent. of metallic iron. The salt is too weak in quinine to be used as an antiperiodic in the treatment of malaria, but is valued on account of the mild tonic effect of small doses of quinine and the blood-making properties of iron. Although quite soluble in water, its bitter and ferruginous taste renders its administration in liquid form undesirable. Being deliquescent, it is more suitably *administered* in capsules than in pills, or still better in wine of iron, of which it is the chief constituent. It is made by dissolving ferric citrate in distilled water, quinine and citric acid in distilled water, evaporating, by the aid of gentle heat at a moderate temperature, to a syrupy consistency, spreading in thin layers upon plates of glass to dry, and then breaking into scales.

Dose.—0.3 to 0.6 Gm.; 5 to 10 grains.

Ferri et Quininæ Citras Solubilis (*Soluble Iron and Quinine Citrate*).—Thin, transparent scales, of a greenish, golden-yellow color, and having a bitter, mildly ferruginous taste; deliquescent. Rapidly and completely *soluble* in cold water, partially soluble in alcohol; an aqueous solution shows a slightly acid reaction to blue litmus paper. Made by dissolving Ferric Citrate, Quinine, and Citric Acid by the aid of gentle heat in Distilled Water, and then gradually adding, with constant stirring, a sufficient quantity of Ammonia Water, so that after each addition of the latter the precipitated quinine will be redissolved, and the liquid acquires a greenish-yellow tint; lastly, evaporate the solution in a water-bath, at a moderate temperature, to the consistence of syrup, and spread in thin layers upon plates of glass, so that, when dry, the salt may be obtained in scales. It should contain not less than 11.5

per cent. of dried quinine and ferric citrate, corresponding in amount to not less than 13.5 per cent. of metallic iron. It is *used* in the treatment of the same class of cases as iron and quinine citrate. Being deliquescent and freely soluble, it is best *prescribed* in the form of capsules, or in solution, or still better as the bitter wine of iron, of which it is the chief constituent.

Dose.—0.3 to 0.6 Gm.; 5 to 10 grains.

Vinum Ferri Amarum (*Bitter Wine of Iron*).—Made by dissolving 5 Gm. of Soluble Iron and Quinine Citrate in 50 Cc. of White Wine, adding 6 Cc. of Tincture of Sweet Orange-peel, 30 Cc. of Syrup, and lastly enough White Wine to make the product measure 100 Cc. The mixture should be set aside for two days, and then filtered through paper in a well-covered funnel.

Dose.—4 to 8 Cc.; 1 to 2 f3.

Ferri et Strychninæ Citras (*Iron and Strychnine Citrate*).—Thin, transparent scales, varying in color from garnet-red to yellowish-brown, having a bitter, slightly ferruginous taste; deliquescent in moist air; readily and completely *soluble* in water, partially soluble in alcohol. An aqueous solution of the salt is slightly acid to blue litmus paper. It is made by dissolving Iron and Ammonium Citrate, Strychnine, and Citric Acid in Distilled Water, evaporating at a gentle temperature to the consistence of syrup, and spreading upon plates of glass, so that, when dry, the salt may be obtained in scales. It should contain not less than 0.9 per cent. nor more than 1 per cent. of strychnine, and ferric citrate corresponding in amount to not less than 16 per cent. of metallic iron. This salt may be employed in all those conditions in which a combination of iron and quinine are valuable, particularly in *asthenia* and conditions of *exhaustion* following prolonged illness. It has the disadvantage of combining, in unvarying proportions, a very rapid acting and powerful substance (strychnine) with a slow acting remedy (iron). In such a combination, neither ingredient could be increased or decreased singly. Each grain of the salt contains about one one-hundredth grain of strychnine.

Dose.—0.06 to 0.2 Gm.; 1 to 3 grains.

Official Tartrates

No special importance is attached to the tartrates, nor do they possess any special advantages as a mild ferruginous tonic over the other scale salts of iron. Being freely soluble in water and slightly deliquescent, they are suitable for *prescribing* in solution or capsules, but not in pills.

Ferri et Ammonii Tartras (*Iron and Ammonium Tartrate*).—Thin, transparent scales, varying in color from garnet-red to reddish-brown, having a sweetish, slightly ferruginous taste; slightly deliquescent in air. Very *soluble* in water, insoluble in alcohol; an aqueous solution of the salt should be neutral to litmus paper. Made by dissolving

freshly prepared Ferric Hydroxide in a Solution of Tartaric Acid partially neutralized with Ammonia Water, and evaporating to the consistence of syrup, then spreading in thin layers upon plates of glass, so that when dry the salt may be obtained in scales. It should contain iron and ammonium tartrate, corresponding in amount to not less than 13 per cent. of metallic iron. The preparation is *used* in the treatment of *anemia*.

Dose.—0.3 to 0.6 Gm.; 5 to 10 grains.

Ferri et Potassii Tartras (*Iron and Potassium Tartrate*).—Thin, transparent scales, varying in color from garnet-red to reddish-brown, and having a sweetish, ferruginous taste; slightly deliquescent in air; very *soluble* in water, insoluble in alcohol; an aqueous solution of the salt should be neutral to litmus paper. Made by dissolving freshly precipitated Ferric Hydroxide with a Solution of Potassium Bitartrate and evaporating to a gentle temperature, with the addition of just sufficient Ammonia Water to dissolve the precipitate to the consistence of syrup, spreading in thin layers upon glass plates, so that when dry the salt may be obtained in scales. It should contain iron and potassium tartrate, corresponding in amount to not less than 15 per cent. of metallic iron. Useful as a mild, non-astringent chalybeate. It is but feebly astringent, has but little taste, and, being freely soluble in water, is suitable for *administering* in aqueous liquids.

Dose.—0.3 to 0.6 Gm.; 5 to 10 grains.

Official Chlorides

The three official chlorides are ferric compounds; all are powerfully astringent, hemostatic, and constipating. The solution of ferric chloride, containing a large quantity of free hydrochloric acid, is also an escharotic.

Liquor Ferri Chloridi (*Solution of Ferric Chloride*).—A reddish-brown liquid, having a faint odor of hydrochloric acid, an acid, strongly styptic taste, and an acid reaction; made by acting upon iron in the form of fine, bright wire with hydrochloric acid, oxidizing by nitric acid, and finally adding hydrochloric acid and water. It should contain not less than 29 per cent. of anhydrous ferric chloride ($FeCl_3$), corresponding to 10 per cent. of metallic iron. It may be *mixed* with alcohol and water in all proportions without precipitating. The solution is strongly astringent and hemostatic, and contains a large percentage of free hydrochloric acid; undiluted, it is an escharotic to the skin and mucous membranes. It is rarely used internally as an astringent and hemostatic, but when well diluted with water (1 to 10) may be applied locally to control *bleeding*. Its dilution with alcohol forms tincture of ferric chloride, and upon evaporation to dryness yields the salt, ferric chloride. If administered internally, it should be well diluted with water, and taken through a glass tube to prevent injury to the teeth.

Dose.—0.3 to 0.6 Cc.; 5 to 10 minims.

Ferri Chloridum (*Ferric Chloride*).—Orange-red, crystalline pieces or masses; odorless, or having a faint odor of hydrochloric acid, strongly styptic taste, freely *soluble* in water and alcohol, and deliquescent in moist air. It is made by partial evaporation and crystallization of solution of ferric chloride. The salt is rarely used internally, as an *astringent* and hemostatic, but the deliquesced salt is used locally as a caustic and *styptic*, and in solution as a *hemostatic*.

Dose.—0.06 to 0.2 Gm.; 1 to 3 grains.

Tinctura Ferri Chloridi (*Tincture of Ferric Chloride*). *Synonym*, Tincture of Iron.—A bright, reddish-brown liquid, having a slight, ethereal odor, a very astringent, styptic taste, and an acid reaction. It is made by mixing 35 Cc. of Solution of Ferric Chloride with a sufficient quantity of Alcohol to make 100 Cc., standing aside in a closely covered vessel, protected from light for at least three months, and then transferring to glass-stoppered bottles, kept protected from light. The tincture should contain not less than 13.28 per cent. of anhydrous ferric chloride ($FeCl_3$), corresponding to 4.6 (4.58) per cent. of metallic iron. This preparation of iron is popular as a *chalybeate tonic*. In moderate doses it stimulates the appetite and improves the quality of the blood. It is a diuretic of considerable power, and is extensively employed in the *anemia of Bright's disease*. The remedy possesses the power of increasing the oxidation processes within the blood, and is employed in the treatment of *septic infections*, *boils*, and similar conditions. If administered in excessive doses for a long time, it disorders digestion, induces constipation, and gives rise to headache and irritation of the bladder. Being strongly acid, it is injurious to the teeth, and should be *administered* well diluted in water and through a glass tube. It is the most important constituent of the Solution of Iron and Ammonium Acetate.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

Official Hydroxides

Two preparations of iron hydroxide are official—Ferric Hydroxide and Ferric Hydroxide with Magnesium Oxide. Both are ferric compounds, undergo chemical change when kept, and should be freshly prepared at the time needed.

Ferri Hydroxidum (*Ferric Hydroxide*). *Synonym*, Ferric Hydrate. *Formula*, $Fe(OH)_3$ = 106.14.—A brownish-red magma, wholly soluble in hydrochloric acid without effervescence. The *U. S. Pharmacopœia* gives the following process for preparing:

Solution of Ferric Sulphate	100 Cc.
Ammonia Water	138 Cc.
Water, a sufficient quantity.	

To the Ammonia Water, previously diluted with 500 Cc. of cold water, add, with constant stirring, the Solution of Ferric Sulphate,

previously diluted with 1000 Cc. of cold Water. As soon as the precipitate has subsided, draw off the clear liquid by means of a siphon, then mix the precipitate intimately with about 1000 Cc. (1 quart) of cold water, again draw off the clear liquid after subsidence of the precipitate, and repeat this operation until a portion of the decanted liquid gives not more than a slight cloudiness with barium chloride test solution. Finally, transfer the precipitate to a wet muslin strainer, and after it has drained, mix it with sufficient cold water to make the mixture weigh 300 Gm. (10 ounces).

The preparation is *used* as an *antidote* to *arsenic*, and also in the manufacture of several *scale salts of iron*. As it undergoes chemical change when kept, it should be freshly prepared when needed. An excess of ammonia water being used in precipitating the ferric hydroxide, unless washed, the magma will contain a sufficient quantity of ammonia water to add to the inflammatory symptoms produced by arsenic. In cases of great urgency, the magma may be washed quickly, but less perfectly, by transferring it at once to a wet muslin strainer, pressing forcibly with the hands until no more liquid passes, and then adding about 8 ounces of water, and administering. Ferric Hydroxide with Magnesium Oxide requires no stirring or washing, and can be prepared more quickly, and is probably a more efficient and practical antidote for arsenic than Ferric Hydroxide.

Dose.—Whole quantity prepared by the above formula.

Ferri Hydroxidum cum Magnesii Oxido (*Ferric Hydroxide with Magnesium Oxide*). *Synonym.* Antidotum Arsenici.—A brownish-red mixture, containing ferric hydroxide, magnesium sulphate, and magnesium hydrate, in water. The *U. S. Pharmacopœia* gives the following process for its preparation:

Solution of Ferric Sulphate	40 Cc.
Magnesium Oxide	10 Gm.
Water, a sufficient quantity.	

Mix the Solution of Ferric Sulphate with 125 Cc. of Water, and keep the liquid in a large, well-stoppered bottle. Rub the Magnesium Oxide with cold Water to a smooth and thin mixture, transfer this to a bottle capable of holding about 1000 Cc., and fill it with water to about three-fourths of its capacity. When the preparation is wanted for use, shake the Magnesium Oxide mixture to a homogeneous, thin magma, add it gradually to the diluted Solution of Ferric Sulphate, and shake them together until a uniform, smooth mixture results.

Note.—For the rapid preparation of this antidote to arsenical poisoning, the diluted Solution of Ferric Sulphate, and the mixture of Magnesium Oxide with Water, should always be kept on hand, in separate bottles, ready for immediate use.

The preparation is used exclusively as an antidote to arsenic. It can be more quickly prepared than Ferric Hydroxide.

Dose.—The whole quantity prepared by the formula, in broken doses at frequent intervals.

Official Iodides

Two preparations containing *ferrous* iodide are official—Syrup of Ferrous Iodide, and Pills of Ferrous Iodide. They combine the hematic effect of iron with the well-known alterative action of iodides. In both preparations, means are employed to prevent decomposition with consequent liberation of iodine and oxidation of the iron.

Syrupus Ferri Iodidi (*Syrup of Ferrous Iodide*).—A transparent, pale-green, syrupy liquid, containing 5 per cent., by weight, of ferrous iodide (FeI_2), and a small quantity of *diluted hypophosphorous acid*, added as a preservative. It has a sweet, strong, ferruginous taste, and an acid reaction. It is made by dissolving Sugar in a freshly prepared aqueous Solution of Ferrous Iodide and then adding a small quantity of Diluted Hypophosphorous Acid. Should the syrup decompose, the uncombined iodine imparts to it a brownish color. Decomposed syrup, if taken, irritates the mucous membrane of the stomach and disorders digestion. Free iodine in the syrup may be detected by adding to it a few drops of boiled starch solution; if uncombined iodine is present, a blue or purple color is produced.

Syrup of ferrous iodide is a most valuable hematic and alterative. It is *used* in *gonorrhœa*, *rheumatism*, and *glandular enlargements*, *otorrhœa*, *nasal catarrh*, *conjunctivitis*, and *anemia of tubercular subjects*. It should be well diluted and taken through a glass tube.

Dose.—0.3 to 2 Cc.; 5 to 30 minims.

Pilulæ Ferri Iodidi (*Pills of Ferrous Iodide*). *Synonym*, Blancard's Pills.—Each pill contains about 1 grain of ferrous iodide, and are coated by the application of an ethereal solution of tolu. Uncombined iodine, if present, may be detected by triturating a pill in water and testing with boiled starch solution. They are used in the same class of cases as is syrup of ferrous iodide.

Dose.—1 to 3 pills.

Official Phosphates, Pyrophosphates, and Hypophosphites

Phosphates and Hypophosphites of iron are supposed to possess special virtue, but are probably overrated as restoratives and *stimulants to nutrition* in *pulmonary tuberculosis*, *neurasthenia*, and similar conditions arising from an excessive expenditure of nervous energy. This class of remedies is augmented by three ferric salts—Ferric Hypophosphite, Soluble Ferric Phosphate, Soluble Ferric Pyrophosphate, and a number of preparations containing them.

Ferri Hypophosphis (*Ferric Hypophosphite*). *Formula*, $Fe(PH_2O_2)_3$ = 249.09.—A white or grayish-white powder; permanent in air, odorless, and nearly tasteless. It is *soluble* in 2300 parts of cold and 1200 parts of boiling water. In the presence of hypophosphorous acid, it is more readily soluble. A warm, concentrated solution of an alkaline

citrate dissolves it, the solution being of a green color. Advantage is taken of the solvent action of citrates upon the salt in manufacturing Compound Syrup of Hypophosphites, of which it is an ingredient. Like other hypophosphites, it is a powerful oxidizer and explosive when triturated dry with readily oxidizable substances. In addition to the incompatibilities given under iron, it precipitates mercury from solution of mercuric chloride, and discolorizes solutions of potassium permanganate.

Syrupus Hypophosphitum Compositus (*Compound Syrup of Hypophosphites*.—Each 100 Cc. contain 3.5 Gm. of Calcium Hypophosphite, 1.75 Gm. of Potassium Hypophosphite, 1.75 Gm. of Sodium Hypophosphite, 0.225 Gm. of Ferric Hypophosphite, 0.225 Gm. of Manganese Hypophosphite, 0.110 Gm. of Quinine, 0.0115 Gm. of Strychnine. Each 4 Cc. (1 fluidram) contains about 0.00046 Gm. ($\frac{1}{140}$ grain) of Strychnine.

Dose.—2 to 8 Cc.; ½ to 2 f℥.

Ferri Phosphas Solubilis (*Soluble Ferric Phosphate*).—Thin, bright green, transparent scales, having an acidulous, slightly saline taste; containing Ferric Phosphate corresponding in amount to not less than 12 per cent. of metallic iron. It is completely *soluble* in water, such a solution showing a slightly acid reaction with litmus paper, and insoluble in alcohol. It is made by mixing solutions of ferric citrate and sodium phosphate, evaporating, and scaling. This scale salt, of indefinite chemical character, is sometimes called Sodio-ferric citro-phosphate. It is a mild ferruginous tonic, only feebly astringent, and suitable for *prescribing* in aqueous liquids, pills, or capsules. It enters into the formula of Glycerite of Iron, Quinine, and Strychnine Phosphates; Elixir of Iron, Quinine, and Strychnine Phosphates; and of the Syrup of Iron, Quinine, and Strychnine Phosphates.

Glyceritum Ferri, Quininæ et Strychninæ Phosphatum (*Glycerite of the Phosphates of Iron, Quinine, and Strychnine*).—A light green, transparent liquid, having a bitter-sweet and ferruginous taste. Made by dissolving quinine and strychnine in soluble ferric phosphate acidulated with phosphoric acid and adding glycerin.

Each 100 Cc. contains 8 Gm. of Soluble Ferric Phosphate, 10.4 Gm. of Quinine, 0.08 Gm. of Strychnine. Each 1 Cc. (15 minims) contains about 0.08 Gm. ($1\frac{1}{4}$ grains) of Soluble Ferric Phosphate, 0.104 Gm. ($1\frac{2}{3}$ grains) of Quinine, 0.0008 Gm. ($\frac{1}{80}$ grain) of Strychnine. The preparation combines the tonic effects of the drugs mentioned in its title, although it may be administered with benefit in asthenic states after exhausting diseases. It is more extensively used in making Syrup of the Phosphates of Iron, Quinine, and Strychnine.

Dose.—1 to 2 Cc.; 15 to 30 minims.

Syrupus Ferri, Quininæ et Strychnine Phosphatum (*Syrup of the Phosphates of Iron, Quinine, and Strychnine*).—A light green, transparent liquid, having a distinctly bitter-sweet, acidulous, and ferru-

ginous taste, made by thoroughly mixing 250 Cc. of glycerite of the Phosphates of Iron, Quinine, and Strychnine with 750 Cc. of Syrup. It is just one-fourth as strong as Glycerite, from which it is made, each 4 Cc. (1 f℥) contains 0.08 Gm. ($1\frac{1}{4}$ grains) of Soluble Ferric Phosphate, 0.104 Gm. ($1\frac{2}{3}$ grains) of Quinine, and 0.0008 Gm. ($\frac{1}{80}$ grain) of Strychnine. The preparation combines the tonic effect of iron, quinine, and strychnine. It is useful in asthenic states, and is quite popular as a tonic after prolonged exhausting *fevers* and surgical operations. Aside from being most disagreeable to the taste, it contains the three drugs named in combination, so that no change can be made of one without changing the doses of all of them.

Dose.—2 to 8 Cc.; ½ to 2 f℥.

Elixir Ferri, Quininæ et Strychninæ Phosphatum (*Elixir of Iron, Quinine, and Strychnine Phosphates*). *Synonyms,* Elixir of Iron, Quinine, and Strychnine.—A light green, transparent liquid, having a distinctly bitter-sweet, acidulous, and ferruginous taste, and an agreeable aromatic odor. An elegant pharmaceutical preparation, most pleasing to the eye, but most disagreeable to the taste. It is made by preparing a neutral solution of soluble ferric phosphate, quinine, and strychnine, and adding aromatic elixir to it. Each 100 Cc. contains 1.75 Gm. Soluble Ferric Phosphate, 0.875 Gm. of Quinine, 0.275 Gm. of Strychnine. Each 4 Cc. (1 f℥) contains about 0.064 Gm. (1 grain) of Soluble Ferric Phosphate; 0.032 Gm. ($\frac{1}{2}$ grain) of Quinine, and 0.001 Gm. ($\frac{1}{64}$ grain) of Strychnine.

Dose.—2 to 8 Cc.; ½ to 2 f℥.

Official Sulphates

Both ferrous and ferric sulphates are official, the former as Ferrous Sulphate (in crystals), Granulated Ferrous Sulphate, and Exsiccated Ferrous Sulphate, and the latter as Solution of Ferric Subsulphate, and as Ferric Tersulphate.

Ferri Sulphas (*Ferrous Sulphate*). *Formula,* $FeSO_4+7H_2O$. *Synonym,* Copperas.—Large, pale, bluish-green monoclinic prisms, having a saline styptic taste. Upon exposure to dry air, it effloresces, becoming covered with a whitish powder; upon exposure to moist air, the crystals oxidize, and become coated with a brownish-yellow basic ferric sulphate. It is *soluble* in 0.9 part of water, and insoluble in alcohol. As will be seen by observing the formula, the crystals contain a very large quantity of water of crystallization (7 molecules); by subjecting them to slow heat, they degenerate and lose 38.87 per cent. of their weight (6 molecules) of water of crystallization. An aqueous solution shows an acid reaction to litmus paper.

Dose.—0.06 to 0.03 Gm.; 1 to 5 grains.

Ferri Sulphas Exsiccatus (*Exsiccated Ferrous Sulphate*). *Synonym,* Dried Sulphate of Iron.—A greenish-white powder, slowly but completely *soluble* in water, insoluble in alcohol; made by heating 100 Gm.

of Ferrous Sulphate in coarse powder, contained in a porcelain dish, on a water-bath, at a temperature of 40° C. (104° F.), with constant stirring, until the product weighs from 64 to 65 Gm. This process deprives ferrous sulphate of a large part of its water of crystallization, about 15 per cent. being retained; 3 grains of the exsiccated ferrous sulphate represents about 5 grains of the crystals. This is the most suitable form of ferrous sulphate for incorporating into pills, and enters into the composition of the official Pills of Aloes and Iron.

Dose.—0.03 to 0.2 Gm.; ½ to 3 grains.

Ferri Sulphas Granulatus (*Granulated Ferrous Sulphate*). *Formula*, $FeSO_4 + 7H_2O = 276.01$—A very pale, bluish-green, crystalline powder, made by rapidly cooling a hot concentrated aqueous solution of ferrous sulphate, granulating by stirring as crystallization occurs; collecting, and drying. This salt is less liable to oxidation, and more conveniently weighed and handled than ordinary ferrous sulphate, and, therefore, more popular for prescriptions. Ferrous sulphate, in all three of its forms, is one of the most astringent salts of iron. It is *used internally* in the treatment of *anemia* and in *diarrhœa;* solutions of it are used *locally* in the treatment of *leucorrhœa*, and for controlling slight *hemorrhages of the nose, mouth, or elsewhere.* In *overdoses*, it produces abdominal pain, nausea, vomiting, and purging.

Dose.—0.06 to 0.3 Gm.; 1 to 5 grains.

Liquor Ferri Subsulphatis (*Solution of Ferric Subsulphate*). *Synonym*, Monsel's Solution.—A deep reddish-brown, syrupy liquid, having a very astringent, but not caustic taste, and a strongly acid reaction. Made by heating Ferrous Sulphate in a mixture of Sulphuric and Nitric Acids; when evaporated at a moderate heat upon a glass or porcelain plate, it yields transparent deliquescent scales, and at a somewhat higher temperature it is converted into a yellowish powder, which is less deliquescent, and is known as Monsel's Salt. Monsel's Solution and also Monsel's Salt are powerfully styptic, and were formerly very popular as a local application for controlling *hemorrhages.* If used for such purposes the solution should be well diluted in water before being applied. In *overdoses*, the solution produces gastro-intestinal inflammation. The *antidote* is soap, or other mild alkalies.

Dose.—0.3 to 0.6 Cc.; 5 to 10 minims.

Liquor Ferri Tersulphatis (*Solution of Ferric Sulphate*).—A dark red, syrupy liquid, having an acid, strongly stypic taste, and powerfully acid reaction. It contains about 36 per cent. of normal ferric sulphate. It is made by heating Ferrous Sulphate in a mixture of Nitric and Sulphuric Acids. Sulphuric acid being largely in excess, being strongly acid, if taken *internally* without dilution, it gives rise to violent gastro-enteritis; its *antidote* is soap or other mild alkalies. The solution enters into the manufacture of the arsenic antidote, and is the usual source of ferric hydrate from which several official preparations are made.

FICUS—Fig

Family, Moraceæ.

The partially dried ripe fruit of *Ficus Carica.*

Figs contain about 15 per cent. of akenes (seeds) and cellular tissue, 50 to 60 per cent. of glucose, with gum, fat, phosphates, and chlorides.

Action and Uses.—Figs are used as an article of diet, and as a mild laxative in *chronic constipation.* Hot figs may be applied locally to hasten suppuration over *gum-boils* and other small *abscesses.* It is one of the ingredients of the Confection of Senna.

FŒNICULUM—Fennel

Synonym, Fennel Seed. *Family,* Umbelliferæ.

The dried, nearly ripe fruit of *Fœniculum Vulgare,* and herb native to southern Europe, western Asia, and cultivated in temperate zones. The mericarps are usually separate, each $\frac{1}{8}$ to $\frac{1}{2}$ inch (3 to 12 mm.) long, $\frac{1}{12}$ to $\frac{1}{8}$ inch (2 to 3 mm.) broad, more or less curved, with five prominent, light-colored primary ribs, otherwise smooth; yellowish or brownish green; pericarp containing an oil tube between each two ribs, and two upon the flat side; odor and taste aromatic. The names applied to several varieties of fennel are German fennel, sweet fennel, Roman fennel, wild fennel, and bitter fennel. That most extensively employed in this country is the German fennel. The drug depends for its medicinal properties upon a volatile oil.

Action and Uses.—Fennel is a carminative, a stimulant, a stomachic, and an aromatic. The fruit is used as an ingredient of Compound Infusion of Senna. The oil is used to give an agreeable flavor to several pharmaceutical preparations, and is one of the ingredients of Compound Powder of Glycyrrhiza, and Compound Spirit of Juniper.

Official Derivative and Preparation

Aqua Fœniculi (*Fennel Water*).—Made from oil of fennel.
Dose.—4 to 30 Cc.; 1 to 8 f℥.

Oleum Fœniculi (*Oil of Fennel*).—A volatile oil distilled from fennel.
Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

FRANGULA—Frangula

Synonym, Buckthorn. *Family,* Rhamnaceæ.

The dried bark of *Rhamnus Frangula* collected at least one year before using.

The Buckthorn plant is a straggling bush, growing to the height of 10 or 15 feet. It is indigenous to Europe, Northern Asia, growing in hedges and bushy places.

The bark is from $\frac{1}{3}$ to 1 inch (8 to 25 mm.) thick, externally grayish-brown or purplish-black, with numerous lenticles; inner surface smooth, minutely striated, brownish-yellow to deep black. It appears in the market in quills of variable length; has a distinct odor and a somewhat aromatic, sweetish bitter taste. The powder should be free from stone cells, which distinguishes it from cascara sagrada. It contains *frangulin*, yellowish resinous matter, *tannin*, an amorphous bitter principle, and an odorous volatile principle. When first collected the bark contains a nauseating, irritating, hydrolitic ferment, rendering the recently collected bark unfit for immediate use, but the ferment is destroyed by long keeping.

Action and Uses.—Frangula is used exclusively as a *laxative*, but on account of the griping pain accompanying large doses, it should never be used as a purgative. As a rule, it should not be prescribed alone, but in combination with other laxatives.

Official Preparation

Fluidextractum Frangulæ (*Fluidextract of Frangula*).—Made with a menstruum of 5 parts of Alcohol, and 8 parts of Water.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

GALLA—Nutgall

Family, Cupuliferæ.

A subglobular excrescence, $\frac{2}{5}$ to $\frac{4}{5}$ inches (1 to 2 cm.) in diameter; externally, olive-green or blackish gray, growing on the tender branches of *Quercus Infectoria*, caused by the punctures and deposited ova of the insect Cynips tinctoria. In the centre of each excrescence is a cavity containing either the partially developed insect or pulverulent remains left by it. Upon the sides of some excrescences are seen round perforations, made by the insect effecting its escape from the central cavity. Nutgalls owe their medicinal properties to the large percentage of *tannin* and *gallotannic* acid (50 to 60 per cent.) contained in them. It also contains from 2 to 3 per cent. of gallic acid.

Action and Uses.—As will be inferred from its composition, nutgall is used as a powerful astringent. It is *used* as a *mouth wash*, to control *bleeding from the gum;* internally to check *hemorrhage from the stomach* and *bowels*, and to control *serous diarrhœa*. The ointment is used as a styptic and astringent in the treatment of *hemorrhoids*. (See also tannic and gallic acid.)

Incompatibilities.—Nutgall is incompatible with all ferric salts and solutions, and with liquids containing alkaloids.

Official Preparations

Tinctura Gallæ (*Tincture of Nutgall*).—Made by percolating 20 Gm. of Nutgall with a menstruum of Alcohol, 9 parts, and Glycerin, 1 part, to make 100 Cc. of tincture.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Unguentum Gallæ (*Nutgall Ointment*).—Twenty per cent. of powdered Nutgall incorporated with 80 per cent. of Ointment.

GAMBIR (to replace *Catechu*, U. S. P. 1890)—Gambir

Family, Rubiaceæ.

An extract prepared from the leaves and twigs of *Ourouparia Gambir*, a climbing shrub, native to Malacca, Sumatra, Cochin-China, and cultivated in the Islands of Bintang, Singapore, and Prince of Wales. The leaves, twigs, and shoots are chopped into pieces, exhausted by macerating in hot water, and while the extract is still in a semifluid state, it is poured upon trays, cut into cubes, and dried. The drug was made official in the *U. S. Pharmacopœia* of 1900, to replace Catechu.

Gambir is seen in reddish-brown, pale brownish-gray, or light brown, irregular masses or cubes, having a bitterish, very astringent, and sweetish after-taste. The drug should be free from starch; not less than 70 per cent. of it should be soluble in alcohol, and when incinerated should yield not more than 5 per cent. of ash. It owes its medicinal properties to a peculiar form of tannic acid, known as *catechutannic* acid, which it contains in large amounts, 30 to 40 per cent. Catechutannic acid is *insoluble* in ether, turns greenish black with ferric salts, but does not precipitate gelatin. Upon keeping, the liquid preparations of the drug often gelatinize.

Action and Uses.—Catechu is a valuable astringent, and is used to check secretions from mucous membranes, to constringe and contract them when they are relaxed, and to check *oozing hemorrhage*. It is employed as a gargle in relaxed *sore throat;* as a *mouth wash* when the gums are soft and bleeding; and internally in the treatment of *diarrhœa*. It replaces Catechu in all preparations of that drug formerly official.

Incompatibilities.—It is incompatible with all ferric salts and solutions.

Dose.—0.3 to 2 Gm.; 5 to 30 grains.

Official Preparations

Tinctura Gambir Composita (to replace *Compound Tincture of Catechu*, U. S. P. 1890; *Compound Tincture of Gambir*).—Prepared by maceration from 50 Gm. of Gambir, 25 Gm. of Saigon Cinnamon, and Diluted Alcohol to make 1000 Cc.

Dose.—2 to 8 Cc.; ½ to 2 f℥.

Trochisci Gambir (to replace *Troches of Catechu*, U. S. P. 1890; *Troches of Gambir*).—Each containing 1 grain of Gambir made into a troche with Sugar, Tragacanth, and Stronger Orange-flower Water.

GELATINUM—Gelatin

Gelatin is an amorphous, more or less transparent, purified, air-dried solid, obtained by treating the skin, ligaments, and bones of certain animals with boiling water. It is usually seen in shreds or thin sheets, should be colorless, or of not more than a slightly yellowish tint, free from odor, and, when incinerated, leave not more than 2 per cent. of residue. In dry air it remains unaltered, but putrefies rapidly in moist air or in solution. It is *insoluble* in cold water, but when immersed in it swells, softens, and absorbs 5 to 10 times its weight. Gelatin is *soluble* in boiling water, acetic acid, and glycerin; insoluble in alcohol, ether, and chloroform. When dissolved in boiling water (1 in 50), it should solidify upon cooling and form a transparent jelly.

Action and Uses.—When administered by the mouth or subcutaneously, gelatin increases the coagulability of the blood, and is *used* for controlling and preventing *hemorrhages*. Gelatin being liable to contamination by the germs of tetanus, and numerous cases of lockjaw having been traced to its use by the hypodermic method, only specially prepared and sterilized solution should be used in this way. Aside from its use as a medicine, gelatin is an article of diet, and is also used in pharmacy for coating pills, as a vehicle for making suppositories, and for making hard and soft capsules. In making soft capsules, a small quantity of glycerin is added to soften the gelatin.

Incompatibilities.—Gelatin is precipitated from aqueous solutions by tannic acid, mercuric chloride, alcohol, chloroform, ether, and solution of formaldehyde.

Official Préparation

Gelatinum Glycerinatum (*Glycerinated Gelatin*).—Solid masses made by immersing gelatin in cold water until it swells, dissolving in glycerin by the aid of heat, cooling, and cutting into pieces of suitable size. Glycerinated gelatin is used as a vehicle in making *suppositories* and *pessaries*. For making suppositories, bougies, or pessaries with this vehicle, the following formula may be employed:

> The Medicinal Substance, the prescribed quantity.
> Glycerinated Gelatin.
> Glycerin.
> Water, a sufficient quantity.

Mix the medicinal substance, if solid and soluble in water or glycerin, or if a miscible liquid, with a little water, and add sufficient glycerin to make the weight of the mixture one-half that of the finished mass. Then thoroughly incorporate it with an equal weight of melted glyceri-

nated gelatin, and pour it at once into suitable moulds which have been greased with a small quantity of petrolatum. Cool the moulds thoroughly before removing the suppositories.

GELSEMIUM—Gelsemium

Synonym, Yellow Jasmine. *Family,* Loganiaceæ.

The dried rhizome and roots of *Gelsemium sempervirens,* a climbing plant growing in the United States south of Virginia. It takes its synonym from the color of its flowers, which are deep yellow, tubular, and have a fragrant odor.

The rhizome is in cylindrical pieces of various lengths, from $\frac{1}{5}$ to $1\frac{1}{5}$ inches (5 to 30 mm.) in diameter; externally light yellowish brown; the wood is pale yellow, porous, with numerous distinct medullary rays in the rhizome; the taste is slightly aromatic and bitter. The drug contains an alkaloid *gelsemine.*

Action and Uses.—Gelsemium is a powerful depressant to the circulation, respiration, and spinal cord, and to the motor fibers of the nerves of the head. It only lowers temperature when given in overdoses. Used locally in the eye, it is a mydriatic, causing wide dilatation of the pupil. The drug is *used* in the treatment of *headache* and *migraine,* in the early stages of *acute inflammation,* in *asthma,* and in *amenorrhœa* and *dysmenorrhœa.* In *overdoses,* the drug is a violent poison, depressing the circulation, and paralyzing the respiratory centres. The symptoms produced by gelsemium poisoning are languor, muscular weakness, ptosis, internal squint, drop-jaw, feeble rapid pulse, cold clammy skin, and shallow respiration. The *treatment of poisoning* consists in the use of emetics and the stomach pump, if seen before the drug is all absorbed from the stomach, or if the patient is sufficiently strong to permit of their use; the administration of aromatic spirit of ammonia, digitalis, strychnine, and ammonia as circulatory and respiratory stimulants, and the application of external heat.

Official Preparations

Fluidextractum Gelsemii (*Fluidextract of Gelsemium*).—Made with a menstruum of alcohol.

Dose.—0.06 to 0.2 Cc.; 1 to 3 minims.

Tinctura Gelsemii (*Tincture of Gelsemium*).—Made by percolating 10 Gm. of Gelsemium with a menstruum of 6.5 parts of Alcohol, and 3.5 parts of Water to make 100 Cc.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

GENTIANA—Gentian

Family, Gentianaceæ.

The dried rhizome and roots of *Gentianæ lutea,* a perennial herb growing in Switzerland, France, Portugal, Germany, and England,

Gentian comes into commerce in nearly cylindrical pieces or longitudinal slices of variable lengths. Externally, it is yellowish brown, the rhizome annulate, the roots longitudinally wrinkled. Internally, it is reddish brown, somewhat spongy, and swells considerably when immersed in water. The drug has a characteristic odor, rendered more distinct by moisture, and a persistent bitter taste. It contains a bitter glucoside known as *gentiopicrin* and *gentisin* (gentianin), a tasteless crystalline principle, which produces a dark olive-green with ferric salts, and is precipitated by tartar emetic and gelatin. In addition, the drug contains *pectin*, which is precipitated by lead acetate.

Action and Uses.—Gentian is a bitter tonic, which when taken internally increases the flow of the digestive juices. It is *used* in treating *anorexia*, *dyspepsia*, and *subacute* and *chronic gastric* and *intestinal catarrh*.

Incompatibilities.—Gentian is incompatible with antimony and potassium tartrate, and lead acetate. Its alcoholic preparation (gentisin) produces a dark olive-green color with ferric salts. Unlike most drugs containing pectin, the preparations of gentian do not gelatinize when kept.

Official Preparations

Fluidextractum Gentianæ (*Fluidextract of Gentian*).—Made with a menstruum of diluted alcohol.

Dose.—2 to 4 Cc.; ½ to 1 f℥.

Extractum Gentianæ (*Extract of Gentian*).—A pilular extract made by exhausting Gentian with Cold Water and evaporating the percolate.

Dose.—0.06 to 0.6 Gm.; 1 to 10 grains.

Tinctura Gentianæ Composita (*Compound Tincture of Gentian*).—Made by percolating 10 Gm. of Gentian, 4 Gm. of Bitter Orange Peel, and 1 Gm. of Cardamom, with a menstruum of 3 parts of Alcohol, and 2 parts of Water to make 100 Cc. of tincture.

Dose.—2 to 8 Cc.; ½ to 2 f℥.

GERANIUM—Geranium

Family, Geraniaceæ.

The dried rhizome of *Geranium maculatum*, a perennial herb with a green, erect, hairy stem, growing to the height of 1 to 2 feet, in rich woody thickets in the United States and Canada.

The rhizome is cylindraceous, somewhat flattened, and sharply tuberculated, from ⅛ to ⅜ inch (3 to 15 mm.) in diameter; longitudinally wrinkled, dark brown, reddish brown, or purplish within, bark thin, wood distinct; medullary rays broad; central pith large; taste strongly astringent. The drug depends for its activity upon *tannin* (15 to 30 per cent.) and *gallic acid*, and in addition contains red coloring matter, starch, *pectin*, and sugar.

Action and Uses.—Geranium, like other drugs containing tannin, is an astringent. It is *used* as a gargle in relaxed *sore throat*, and in *diarrhœa*.

Incompatibilities.—It is incompatible with ferric salts, tartar emetic, gelatin, and other substances incompatible with tannic acid.

Official Preparation

Fluidextractum Geranii (*Fluidextract of Geranium*).—Made with a menstruum of 2 parts of alcohol, 1 part of water, and 0.1 part of glycerin.

Dose.—2 to 4 Cc.; ½ to 1 f℥.

GLANDULÆ SUPRARENALES SICCÆ—Desiccated Suprarenal Glands

The suprarenal glands of sheep (Ovis aries) or ox (Bos taurus) freed from fat, and cleaned, dried, and powdered. It is prepared by removing the external fat, and connective tissue of the glands, drying them as rapidly as possible in a warm current of air at a moderate temperature, reducing to coarse powder, and removing the remaining fat by treating with petroleum benzin, and again drying the residue. One part of the powder represents six parts of the fresh glands. Suprarenal glands owe their medicinal property to an active principle, known under the several commercial names as *Adrenalin*, *Adrin*, *Suprarenin*, and *Suprarenalin*. Adrenalin, a light grayish or brownish-white microcrystalline substance, sparingly soluble in cold water, more freely soluble in hot water. When long kept in aqueous solution it is oxidized and becomes brown. Adrenalin is readily soluble in acids, forming salts which are obtainable in hygroscopic masses, but not in crystalline form. The most frequently used salt is the chloride.

Action and Uses.—Suprarenal gland and its active principle, when brought in contact with bloodvessels, stimulates their muscular coats and contracts them. This action may be readily observed upon mucous membranes which are decidedly blanched or whitened by applying a solution of suprarenal gland or of adrenalin, the bloodvessels being so markedly contracted as to render the mucous membrane almost bloodless. The rapid and powerful action of the drug makes it of value for controlling and preventing hemorrhage, and for overcoming arterial relaxation in the presence of shock. The drug when swallowed is altered by the gastric juices, and in order to obtain the best effects in hemorrhage it should be applied locally to the bleeding area; to overcome shock or vascular relaxation, adrenalin chloride greatly diluted in normal salt solution should be administered intravenously or by hypodermoclysis. The gland has also been used in the treatment of Addison's disease.

Dose.—0.12 to 0.6 Gm., 2 to 10 grains. For local application, one part of the gland is macerated with about 10 parts of warm water. Adrenalin

Chloride is placed upon the market in hygroscopic masses, the dose of which is about $\frac{1}{1000}$ to $\frac{1}{10}$ grain, and also in aqueous solution (1 to 1000), the dose of which would be 10 to 100 drops. As a local application to control *hemorrhage*, adrenalin solution may be used in this strength or as weak as 1 to 20,000. For use hypodermically, or by hypodermoclysis, 1 to 2 f℥ of the solution (1 to 1000) is diluted with a pint of normal salt solution.

GLANDULÆ THYROIDEÆ SICCÆ—Desiccated Thyroid Glands

The dried glands of sheep (*Ovis aries*), freed from fat and cleaned, dried, and powdered. It is prepared by removal of the external fat and connective tissues of the glands, drying them as rapidly as possible in a warm current of air at a moderate temperature, reducing to a coarse powder, and removing the remaining fat by treating the powder with petroleum benzin, and again drying the residue.

The official product is a yellowish or light dull-brown powder, partially soluble in water, one part of which represents 5 parts of the fresh glands. When exposed to air it is liable to become damp, and then deteriorates, and should therefore be kept in a dry place in well-stoppered bottles. Desiccated thyroid glands depend for their activity upon an iodine-containing principle known as *thyroidin*, which, as yet, has not been isolated in such state of purity as to admit accurate description.

Action and Uses.—The thyroid gland contains in it some substance which decidedly affects nutrition. When administered internally in full doses, there is progressive loss of weight, shortness of breath, weak, rapid, and irregular pulse, and extreme nervousness. The loss of weight is due chiefly to the destruction of fat, and in part also to the destruction of nitrogenous substances of the body. The drug has been found to be of great value in the treatment of *myxœdema* and *cretinism*. An abundance of nitrogenous food should be taken by patients under treatment with thyroid gland. The drug is best *administered* in the form of powder or compressed tablets.

Dose.—0.12 to 0.3 Gm.; 2 to 5 grains.

GLYCERINUM—Glycerin

Glycerin is a clear, colorless liquid, of a thick, syrupy consistency, having a warm, sweet taste, obtained by decomposing fats or fixed oils by means of superheated steam under pressure. It should contain not less than 95 per cent. of absolute glycerol, $CH_2OH.CHOH.CH_2OH$. When exposed to moist air, it absorbs moisture. When applied to congested tissues it absorbs moisture, depleting the tissues to a certain extent. It is soluble, in all proportions, in water and alcohol, but is insoluble in ether, chloroform, petroleum benzin, benzene, and fixed and volatile oils. It unites with alkalies and alkaline earths to form

soluble compounds, and increases the solubility in water of tannic acid, phenol, and boric acid. Its aqueous solution is neutral to litmus paper. Commercial glycerin contains many impurities, such as sugar, butyric, sulphuric, and oxalic acids, calcium salts, chlorides, acrolein, heavy metals and arsenic, and, therefore, when used for medicinal purposes care should be taken to select glycerin free from impurities.

Action and Uses.—When administered by mouth or per rectum glycerin is a laxative of particular value in *chronic constipation*. It is conveniently employed as such in the form of rectal suppositories. The dehydrating properties of glycerin makes it of value as a local application to deplete congested tissues. One of its most frequent uses, as such, is as a local application on tampons for relieving *congestion of the uterine cervix*. Although of limited value as a medicine, glycerin is one of the most useful solvents and preservatives, and, therefore, is extensively employed in preparing many official and extemporaneous liquids. Glycerin, along with alcohol and water, is used as a *menstruum* in preparing many extracts, fluidextracts, and tinctures. It is of particular value for *increasing the solubility* of phenol, tannic acid, and boric acid; for *retarding chemical changes* in liquid preparations containing iron, and for preventing solid extracts and pill masses from becoming dry and hard. It is particularly valuable as an *excipient* for making quinine pills.

Incompatibilities.—Glycerin decomposes potassium permanganate; forms an explosive compound with strong nitric acid, or when triturated with dry oxidizing agents. It does not mix with most volatile oils to form a clear solution.

Official Preparation

Suppositoria Glycerini (*Suppositories of Glycerin*).—Made by dissolving 0.5 Gm. of Monohydrated Sodium Carbonate in 5 Cc. of Water, adding to 30 Gm. of Glycerin and 2 Gm. of Stearic Acid, contained in a dish, on a water-bath, and heating the mixture carefully until carbon dioxide ceases to be evolved and the liquid is clear, pouring into suitable moulds, removing the suppositories when they are completely cold, and preserving them in tightly stoppered glass containers. The above quantity is sufficient to make 10 suppositories, each containing 3 Gm. (45 grains) of saponified glycerin.

Official Glycerites

Glycerites are solutions of medicinal substances in glycerin.

Glyceritum Acidi Tannici (*Glycerite of Tannic Acid*).—Made by dissolving 20 Gm. of Tannic Acid in 80 Gm. of Glycerin. Freely *soluble* in water. Used locally and internally.

Dose.—0.6 to 4 Cc.; 10 to 60 minims.

Glyceritum Amyli (*Glycerite of Starch*).—Made by triturating 10 Gm. of Starch with 10 Cc. of Water, adding to 80 Gm. of Glycerin contained

in a porcelain dish, and heating to about 140° C. (284° F.), continuing the heat with constant stirring until a translucent jelly is formed.

Used as a substitute for ointment bases as a vehicle for substances intended for local application.

Glyceritum Boroglycerini (*Glycerite of Boroglycerin*).—A thick syrupy liquid made by dissolving, by the aid of heat, 31 Gm. of Boric Acid in enough Glycerin to make 100 Gm. of the finished product.

Used as an antiseptic, and for readily preparing strong aqueous solutions of boric acid.

Glyceritum Ferri, Quininæ et Strychninæ Phosphatum (*Glycerite of the Phosphates of Iron, Quinine, and Strychnine*).—A liquid made by dissolving 80 Gm. of Soluble Ferric Phosphate in 200 Cc. of Water by the aid of heat, adding 104 Gm. of Quinine, 0.8 Gm. of Strychnine, 200 Gm. of Phosphoric Acid, and enough Water to make 500 Cc., and then 500 Cc. of Glycerin. It is used solely for preparing Elixir of Iron, Quinine, and Strychnine Phosphates, being four times as strong as that elixir.

Dose.—1 to 2 Cc.; 15 to 30 minims.

Glyceritum Hydrastis (*Glycerite of Hydrastis*). *Synonym*, Colorless Hydrastis.—A clear, almost colorless liquid, made by exhausting 100 Gm. of Hydrastis with Alcohol, distilling off the alcohol, pouring the residue into 50 Cc. of ice-cold Water, filtering to separate oily and resinous matter, adding enough cold Water through the filter to make 50 Cc., and then adding 50 Cc. of Glycerin.

Used internally and locally.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Glyceritum Phenolis (*Glycerite of Phenol*).—A liquid preparation made by dissolving 20 Cc. of Liquefied Phenol in 80 Cc. of Glycerin.

Used to furnish phenol in a form readily and freely soluble in water.

Dose.—0.06 to 0.12 Cc.; 1 to 2 minims.

GLYCYRRHIZA—Glycyrrhiza—Licorice Root

Family, Leguminosæ.

The dried rhizome and root of *Glycyrrhiza glabra* or *Glycyrrhiza glandulifera*, the first variety being known as Spanish licorice and the latter as Russian licorice. Spanish licorice is in cylindrical pieces, from $\frac{3}{5}$ to $\frac{4}{5}$ inch (15 to 20 mm.) long, $\frac{1}{5}$ to $\frac{3}{5}$ inch (5 to 15 mm.) thick, longitudinally wrinkled; internally, tawny yellowish; taste, sweetish and slightly acrid. Russian licorice is somewhat tapering, 3 feet (1 M.) in length, $\frac{2}{5}$ to 2 inches (10 to 50 mm.) in diameter, deprived of its outer corky layer (peeled); internally light yellow, taste less sweet than that of the Spanish licorice. The plant from which the root is collected is a perennial herb, with a stem 2 to 5 feet high, native to southern Europe, western Asia and Syria, and cultivated in Russia.

The drug contains a sweet principle known as *glycyrrhizin,* which is only *sparingly soluble* in cold water, but more freely *soluble* in hot water, alcohol, and alkaline solutions, and is precipitated from solution by mineral acids. Licorice contains in addition, *asparagin,* starch, albumin, resin, and nitrogenous extractive matter.

Action and Uses.—Licorice is a mild laxative and a demulcent, and possesses the valuable property of partially disguising the taste of bitter and also saline drugs.

Incompatibilities.—The liquid preparations of licorice and ammoniated glycyrrhizin are incompatible with all strong acids, glycyrrhizin being precipitated by them. The salts of the most heavy metals are precipitated from solution by ammoniated glycyrrhizin.

Official Preparations and Derivatives

Glycyrrhizinum Ammoniatum (*Ammoniated Glycyrrhizin*).—Transparent, dark brownish-red scales, having a very sweet taste, readily *soluble* in water and alcohol. *Used* to disguise the taste of bitter and salty drugs.

Dose.—0.3 to 1 Gm.; 5 to 15 grains.

Extractum Glycyrrhizæ (*Extract of Glycyrrhiza*).—An extract in flattened, cylindrical rolls, prepared by evaporating an aqueous extract.

Dose.—0.3 to 6 Gm.; 5 to 90 grains.

Extractum Glycyrrhizæ Purum (*Pure Extract of Glycyrrhiza*).—An extract of a pilular consistency, made by percolating powdered Glycyrrhiza with a diluted aqueous Solution of Ammonia, evaporating and adding 5 per cent. of Glycerin.

Dose.—0.3 to 6 Gm.; 5 to 90 grains.

Fluidextractum Glycyrrhizæ (*Fluidextract of Glycyrrhiza*).—One of the few fluidextracts miscible with water without being precipitated.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Mistura Glycyrrhizæ Composita (*Compound Mixture of Glycyrrhiza*). *Synonym,* Brown Mixture.

Composition.—Pure Extract of Glycyrrhiza, 3 Gm.; Syrup, 5 Cc.; Acacia, 3 Cc.; Camphorated Tincture of Opium, 12 Cc.; Wine of Antimony, 6 Cc.; Spirit of Nitrous Ether, 3 Cc.; Water, a sufficient quantity to make 100 Cc.

Used in the treatment of acute congestion of the respiratory tract.

Dose.—4 to 16 Cc.; 1 to 4 f℥.

Pulvis Glycyrrhizæ Compositus (*Compound Powder of Glycyrrhiza*). *Synonym,* Compound Licorice Powder.

Composition.—23.6 per cent. of Glycyrrhiza; 18 per cent. of senna; 8 per cent. of Washed Sulphur; 0.4 per cent. of Oil of Fennel; 50 per cent. of Sugar.

Used as a laxative.

Dose.—2 to 8 Gm.; 30 to 120 grains.

Trochisci Glycyrrhizæ et Opii (*Troches of Glycyrrhiza and Opium*).—Each troche contains about $\frac{1}{12}$ grain (0.005 Gm.) of Powdered Opium, $2\frac{1}{3}$ grains (0.15 Gm.) of Extract of Glycyrrhiza, along with Acacia, Sugar, and Oil of Anise.

Used to allay cough.

Dose.—One as required.

Elixir Adjuvans (*Adjuvant Elixir*).—Made by mixing 12 Cc. of Fluidextract of Glycyrrhiza with 88 Gm. of Aromatic Elixir.

Used as a vehicle.

Dose.—4 to 8 Gm.; 1 to 2 f℥.

GOSSYPIUM HERBACEUM—Cotton Plant

The cotton plant, *not official*, is a native of Central Asia, India, and Egypt, and is extensively cultivated in the southern part of the United States; it furnishes three official products—Cotton Root Bark, Purified Cotton, and Cotton-seed Oil.

Official Preparations

Gossypii Cortex (*Cotton Root Bark*). *Family*, Malvaceæ.—The dried bark of *Gossypium herbaceæ* or of other cultivated species of cotton. The bark, which should be collected from fresh roots late in the fall before the onset of frosts, comes into the market in thin flexible bands or quilled pieces; outer surface yellowish brown, longitudinally wrinkled, inner surface whitish, longitudinally striated, and has a faint odor and an astringent and acrid taste. It contains a colorless resin which darkens upon exposure. The drug yields its virtues to both alcohol and water.

Action and Uses.—Cotton root bark is an emmenagogue. In delayed labor due to *uterine inertia* it is used to increase the expulsive power of the pregnant womb. It has also been employed in the treatment of *menorrhagia* and *uterine fibroid*. There are no official preparations of the root. The decoction made from the inner bark is the best method of using the drug.

Dose.—2 to 4 Gm.; 30 to 60 grains.

Gossypium Purificatum (*Purified Cotton*). *Synonym*, Absorbent Cotton.—The hairs of cotton seeds freed from adherent impurities and deprived of fatty matter. Cotton is freed from adherent impurities and freed from fat by boiling in strong alkali solution, washing, treating with chlorinated lime, again washing with a diluted solution of hydrochloric acid, and drying. Cotton so treated, when compressed in the hand and thrown upon the surface of water, should readily absorb water and sink, and the water should give neither an acid nor an alkaline reaction.

When treated with a mixture of nitric and sulphuric acid it is con-

verted into neutral tetranitrocellulose, known as soluble gun-cotton or pyroxylin.

Uses.—Absorbent cotton is extensively used as a surgical dressing, and as a household article. In pharmacy, it furnishes a most convenient filtering material. It is *used* in making pyroxylin.

Oleum Gossypii Seminis (*Cotton-seed Oil*).—A pale yellow, bland oil, free from odor, having a nut-like taste; very *sparingly soluble* in alcohol, readily *soluble* in ether and chloroform, expressed from cotton seeds and subsequently purified.

Action and Uses.—Cotton-seed oil is a demulcent, and is used in pharmacy as a substitute for the more expensive expressed oil of almond and olive oil, supplanting the latter in many of the official liniments. Much of the so-called olive oil imported into this country is nothing more or less than cotton-seed oil which has been exported from New Orleans to Europe, there purified, bottled, and imported into the United States. The oil may be used as a substitute for lard in cooking, as a lubricant for machinery, and in the manufacture of soap.

Dose.—8 to 16 Cc.; 2 to 4 f℥.

Official Derivative from Purified Cotton

Pyroxylinum (*Pyroxylin*). *Synonym*, Soluble Gun-cotton.—A yellowish-white, dry, matted mass, resembling cotton in appearance, made by treating absorbent cotton with a mixture of nitric and sulphuric acid. Chemically it is tetranitrocellulose. It is inflammable, explosive, and *soluble* in 25 parts of a mixture of 3 volumes of ether, and 1 volume of alcohol, such a solution being precipitated by water.

Use.—Pyroxylin is used in making collodion.

GRANATUM—Pomegranate

Family, Punicaceæ.

The bark of the stem and root of *Punica Granatum*, a shrub or small tree which grows wild on the shores of the Mediterranean Sea, in Arabia, Persia, Bengal, China, and Japan, and is cultivated for its fruit in all warm countries. Under favorable circumstances the tree grows to a height of from 15 to 20 feet, and bears a globular fruit about the size of an orange, covered with a reddish-yellow thick rind, and divided internally into many cells, which contains an acidulous pulp, and numerous oblong annular seeds. The bark from the stem is in single quills or transversely curved; outer surface yellowish, or brownish-gray; thick brownish-black fruit heads of a lichen and small lenticles; inner surface grayish-yellow to brownish, finely striate; the phelloderm layer dark green, the inner bark dull greenish-yellow; odor distinct, taste astringent, somewhat bitter; the bark from the root is dark brown, with more or less longitudinal patches

and scales of cork; green phelloderm layer absent; medullary rays extending nearly to the periderm. The bark depends for its activity upon a mixture of alkaloids known as *pelletierine*, and, in addition, contains a large quantity of *tannic acid*, sugar, gum, and pectin.

Action and Uses.—When taken internally, the preparations and alkaloids of pomegranate often produce nausea, vomiting, vertigo, muscular weakness, paralysis of the motor nerves, and double vision. The drug is used exclusively as an anthelmintic and teniacide. When used for this purpose the decoction may be made from 2 ounces of bark and 20 ounces of water, macerating for twenty-four hours, evaporating at a gentle temperature to 1 pint, and straining. A wineglass of this is given every hour until the whole amount is taken. The fluidextract may be administered in doses from 20 to 30 minims every hour; or from 3 to 5 grains of pelletierine tannate may be given in a single dose. Before administering any of the preparations of pomegranate to patients having tapeworm, the individual should first be purged, starved of food for twenty-four hours, and one-half to three-quarters of an hour after the last dose of medicine is given, an active purge should be administered.

Dose.—60 Cc. (2 ℥) of the bark made into a decoction and administered during twenty-four hours.

Official Derivatives and Preparations

Pelletierinæ Tannas (*Pelletierine Tannate*).—A light yellow, amorphous powder, consisting of a mixture of the tannates of the four alkaloids contained in pomegranate bark.

Dose.—0.2 to 0.3 Gm.; 3 to 5 grains.

Fluidextractum Granati (*Fluidextract of Pomegranate*).—Menstruum, alcohol, 9 parts, glycerin, 1 part.

Dose.—1.2 to 2 Cc. (20 to 30 minims) every hour for twenty-four hours.

GRINDELIA—Grindelia

Family, Compositæ.

The dried leaves and flowering tops of *Grindelia robusta* and *Grindelia squarrosa*, the first being a perennial herb, 1 to 3 feet high, growing in elevated regions west of the Rocky Mountains, and the latter upon plains, being less leafy, woody, and brushy, and grows to the height of only about 16 inches.

The leaves are green, smooth, finely dotted, somewhat coriaceous and brittle, broadly spatulate or oblong to lanceolate, sessile or clasping, obtuse, more or less sharply serrate; the flower heads are more or less resinous-viscid, many flowered; the ray florets are yellow, ligulate; the disk-florets yellow, tubular. The drug has a balsamic odor and a pungent, aromatic, and bitter taste. The leaves and involucre are

covered with a *glutinous resin*, which gives to it the name "gum plant." It yields its virtues to alcohol, but not to water. Grindelia contains a *resin*, which gives to the drug its medicinal properties, a volatile oil, a bitter principle, gum, and tannin.

Action and Uses.—Grindelia robusta is an antispasmodic, expectorant, and a diuretic. It is *used* in the treatment of *asthma, subacute* and *chronic bronchitis, subacute* and *chronic cystitis,* and locally for the relief of *poisoning from ivy.*

Official Preparation

Fluidextractum Grindeliæ (*Fluidextract of Grindelia*).—Menstruum, alcohol, 7.5 parts, water, 2.5 parts. This fluidextract is instantly precipitated by water and all aqueous liquids.

Dose.—2 to 4 Cc.; ½ to 1 f℥.

GUAIACUM (*Guaiac Resin* of U. S. P., 1890)—Guaiac

Family, Zygophyllaceæ.

Guaiac is the resin of the wood of *Guaiacum officinale* or of *Guaiacum santum,* a hardwood tree growing to the height of 30 to 40 feet in the West Indies and South America.

The resin, which is official, comes into the market in irregular, greenish gray-brown masses, transparent in thin splinters, fusible, having a balsamic odor and slightly acrid taste. The powder is grayish, turning green upon exposure to air. Not more than 15 per cent. of the drug should be insoluble in alcohol, and upon incineration it should not yield more than 4 per cent. of ash. An alcoholic solution should become blue upon the addition of tincture of ferric chloride. Guaiac is not infrequently adulterated with rosin, which may be detected by macerating it in petroleum benzin, filtering, and adding to the filtrate an equal volume of weak cupric acetate solution (1 to 1000); when free from rosin the liquid will remain colorless, but if the adulterant is present will develop a green color. Guaiac is obtained either as a natural exudate from Lignum Vitæ trees or by making an incision through the bark and collecting the resin from the wounds, or by setting fire to billets of guaiac wood, and collecting the melted resin. It contains *guaiaretic* acid, *guaiac beta-resin, guaiac alpha-resin,* known also as *guaiaconic acid,* which produces a blue color with oxidizing agents, *guaiacic acid,* and *guaiac-yellow.*

Action and Uses.—Guaiac is an alterative, and in large doses a purgative. It is *used* in the treatment of *acute tonsillitis,* and in *subacute rheumatism.* Taking advantage of the change in color produced by oxidizing agents, the tincture is used as a delicate test in determining the presence of blood.

Incompatibilities.—Both of the official tinctures are incompatible with water, being instantly precipitated by it. The drug and all

preparations of it are incompatible with ferric chloride, spirit of nitrous ether, solution of hydrogen dioxide, potassium permanganate, gold and sodium chloride, and other oxidizing agents, and with the mineral acids. Guaiac develops a blue color when mixed with mucilage of acacia.

Dose.—0.3 to 2 Gm.; 5 to 30 grains.

Official Preparations

Tinctura Guaiaci (*Tincture of Guaiac*).—Made by macerating 20 Gm. of Guaiac with Alcohol to make 100 Cc. of tincture.

Dose.—2 to 4 Cc.; ½ to 1 f℥. Best given in milk.

Tinctura Guaiaci Ammoniata (*Ammoniated Tincture of Guaiac*).—Made by macerating 20 Gm. of Guaiac with Aromatic Spirit of Ammonia to make 100 Cc. of tincture.

Dose.—2 to 4 Cc.; ½ to 1 f℥. Best given in milk.

GUAIACOL—Guaiacol

Formula, $C_7H_8O_2$ = 123.13.

A colorless, crystalline solid, melting at 28.5° C. (83.3° F.), or a colorless, refractive liquid, having an agreeable, aromatic odor. *Soluble* in 53 parts of water, and in all proportions of alcohol and ether, and in 1 part of glycerin. It is collected by fractional distillation and purification from beechwood creosote, or prepared synthetically from catechol or from ortho-anisidin. If 2 Cc. of guaiacol with 4 Cc. of petroleum benzin should become turbid, or fail to separate into two distinct layers, it may be known to contain impurities. If 1 Cc. is added to 10 Cc. of sulphuric acid, it should develop a pure yellow color in the liquid; a reddish color indicates creosote.

Action and Uses.—Guaiacol is an expectorant, antiseptic, a local anesthetic, and when applied locally, reduces the temperature, if heightened by fever. It is administered internally in the treatment of *subacute* and *chronic bronchitis*, and *tubercular bronchitis*. In *acute tonsillitis* it may be cautiously applied to the tonsils to abort the inflammation; diluted with 3 parts of glycerin and applied to the scrotum, it gives relief from pain and reduces swelling in the first stage of *acute orchitis;* in *neuralgia of superficial nerves*, its local application frequently gives great relief. The local application to the chest, abdomen, or thigh of a mixture of guaiacol in oil markedly *reduces the temperature of typhoid fever*, but is not regarded as an entirely safe practice. The best *method for administering* guaiacol is in capsules.

Incompatibilities.—Guaiacol reduces many of the inorganic salts, and changes the color of solutions of ferric salts to a blue color.

Dose.—0.12 to 0.6 Cc.; 2 to 10 minims.

Official Derivative

Guaiacolis Carbonas (*Guaiacol Carbonate*). *Formula,* $(C_7H_7O)_2CO_3$ = 272.05.—A white, crystalline powder, almost entirely without taste and odor; *insoluble* in water, *soluble* in 48 parts of alcohol, more freely soluble in ether and chloroform, sparingly soluble in glycerin and fatty oils; prepared by the action of carbonyl chloride upon guaiacol previously dissolved in caustic soda.

Action and Uses.—Guaiacol carbonate is used internally for the same purpose for which guaiacol is used, but being tasteless and without odor, it is less likely to produce gastric indigestion. It may be *administered* in either powders or capsules.

Incompatibilities.—Guaiacol carbonate is decomposed by alkali hydroxides.

Dose.—0.12 to 0.6 Gm.; 2 to 10 grains

GUARANA—Guarana

Family, Sapindaciæ.

A dried paste, consisting chiefly of the crushed seeds of *Paullinia Cupana,* a climbing vine growing in Brazil, and bearing a globular fruit, which splits into three divisions, exposing three globular seeds the size of a filbert. The paste is prepared by roasting the seeds, crushing them in large wooden mortars, winnowing out the testa, adding a small quantity of water and tapioca, moulding into cylindrical rolls and drying over an open fire. It appears in the market in reddish-brown, cylindrical sticks or hard masses, which upon being crushed show numerous coarse fragments of seeds and their blackish-brown integments. It has an astringent, somewhat smoky, pleasantly bitter, and then somewhat sweetish taste. It should contain not less than 3.5 per cent. of its alkaloidal principles. It is only partially soluble in alcohol and water. The drug contains from 3 to 5 per cent. of *caffeine* (guaranina) and about 25 per cent. of *tannin* (paullinitannic acid).

Action and Uses.—Guarana possesses the stimulating and diuretic action of caffeine, and the astringent properties of tannin. It is *used* in the treatment of *headache,* as a *nerve and circulatory stimulant,* and in the treatment of *diarrhœa.*

Incompatibilities.—Guarana precipitates gelatin, most alkaloidal and ferric salts, changing the latter to a greenish-brown color. Unlike other forms of tannic acid, it does not form a precipitate with tartar emetic or copper sulphate.

Dose.—4 to 8 Gm.; 1 to 2 ʒ.

Official Preparation

Fluidextractum Guaranæ (*Fluidextract of Guarana*).—Made with a menstruum of diluted alcohol. Each 100 Cc. contains 3.5 Gm. of the alkaloids of guarana.

Dose.—4 to 8 Cc.; 1 to 2 f ʒ.

HAMAMELIS

Synonym, Witch Hazel. *Family*, Hamamelidaceæ.

Hamamelis Virginiana is a woody shrub, native to North America, growing to the height of from 5 to 15 feet, bears a nut or capsule of two cells, each containing an oily, edible seed. Both the bark and leaves of Witch Hazel are official, and while they contain no powerfully active principle, preparations made from them, particularly the distilled liquid extract, known as hamamelis water, are popular, but are used more extensively in domestic medicine than by physicians.

Official Preparations

Hamamelidis Cortex (*Hamamelis Bark*).—The bark, which is about $\frac{1}{25}$ to $\frac{1}{12}$ inch (1 to 2 mm.) thick, is grayish-brown upon its outer surface, with numerous lenticles, or reddish-brown with short transverse ridges or scars; inner surface pale cinnamon color; taste astringent, somewhat bitter and pungent. The twigs are tough, about $\frac{1}{4}$ inch (6 mm.) thick, bearing nodes at intervals of from 1 to 2 inches (2.5 to 5 cm.), externally yellowish-brown or deep purplish-brown, wood greenish-white, with a small central pith. The drug contains a small quantity of volatile oil, a small percentage of tannic and gallic acids.

Hamamelidis Folia (*Hamamelis Leaves*).—The leaves are from 4 to 6 inches (10 to 15 cm.) long, 2 to 3 inches (5 to 7 cm.) wide, heart-shaped, margins coarsely sinuate; upper surface pale or brownish-green; under surface light green with a satiny luster; the midribs are prominent; it has a slight odor, and an astringent, slightly aromatic, bitter taste.

Action and Uses.—The preparations of hamamelis are mildly astringent, hemostatic, and sedative. They are *used* internally to a limited extent in the treatment of *dysentery* and *diarrhœa*, and in *hemorrhage of the stomach, intestines, kidneys*, and *bladder*. Witch-hazel water is a popular remedy as a local application for controlling slight *hemorrhage* from the nose and gums, as a gargle in *sore throat*, and for allaying *local inflammations*.

Official Preparation of Hamamelis Leaves

Fluidextractum Hamamelidis Foliorum (*Fluidextract of Hamamelis Leaves*).—Made with a menstruum of alcohol, 1 part, water, 2 parts, and 10 per cent. of glycerin.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

Official Preparation of Hamamelis Bark

Aqua Hamamelidis (*Hamamelis Water*). *Synonym*, Distilled Extract of Witch Hazel.—Made by distilling Hamamelis bark with Water and adding 15 per cent. of Alcohol. Mostly used locally.

Dose.—2 to 8 Cc.; $\frac{1}{2}$ to 2 f℥.

HÆMATOXYLON—Hematoxylon

Synonym, Logwood. *Family*, Leguminosæ.

The heart-wood of *Hæmatoxylon campechianum*, a small spreading tree 25 to 40 feet high, trunk 1 to 2 feet thick; native to Central America, and cultivated in the East and West Indies.

The heart-wood, usually taken from trees about ten years of age, is marketed in small reddish-brown chips, the fresh cut surfaces of which are yellowish-brown. The wood has a faint agreeable odor, a distinctly astringent, sweetish taste. It yields its medicinal virtues to water, to which, when slightly acidulated it also imparts a yellowish color, which is turned to purple or violet-red by alkalies. The surfaces of hematoxylon chips, which have undergone fermentation, are of a greenish-metallic luster, such chips being unfit for use. Hematoxylon depends for its medicinal properties upon *hematoxylin* and *tannic acid*.

Action and Uses.—Hematoxylon is an astringent, and is used in the treatment of *serous diarrhœa*. Hematoxylin, the crystalline principle, is used as a stain. When given internally, hematoxylin and its preparations imparts its red color to the stools and urine, and patients taking the drug should be so informed.

Incompatibilities.—See *Acidum Tannicum*.

Official Preparation

Extractum Hæmatoxyli (*Extract of Hematoxylon*).—A dry extract made by maceration and boiling hematoxylon in water, straining, and evaporating.

Dose.—0.5 to 2 Gm.; 8 to 30 grains.

HEDEOMA—Hedeoma

Synonym, American Pennyroyal. *Family*, Labiatæ.

The dried leaves and flowering tops of *Hedeoma pulegioides*, an annual herb growing to a height of from 10 to 15 inches, in barren, sandy fields and hills in North America. The stems are quadrangular, covered with numerous spreading hairs; the leaves are opposite, oblong-ovate, ½ to 1½ inches (12 to 36 mm.) long, with serrated margins, hairy beneath. The flowers are pale blue, tubular, bilabiate, in axillary fascicles. The plant has a strong mint-like odor, and an aromatic and pungent taste. The drug depends for its medicinal activity upon a pale yellow volatile oil, the odor of which is very repugnant to insects.

Action and Uses.—Pennyroyal is a stimulant, aromatic, carminative, and an emmenagogue. It is used to relieve *flatulency* and also to *establish the normal menstrual flow* when delayed from cold. The volatile oil is

also used as an adjuvant and corrective for other medicines. Its presence drives away mosquitoes, flies, and ants. In *overdoses*, the oil is a poison, giving rise to gastro-intestinal and genito-urinary inflammations.

Official Derivative

Oleum Hedeomæ (*Oil of Hedeoma*).—A volatile oil distilled from *Hedeoma*.

Dose.—0.12 to 0.6 Cc.; 2 to 10 minims.

HEXAMETHYLENAMINA—Hexamethylenamine

Synonym, Urotropin. *Formula*, $C_6H_{12}N_4 = 139.18$.

Hexamethylenamine occurs in colorless, odorless crystals, obtained by adding a solution of formaldehyde to stronger water of ammonia. It is *soluble* in 1.5 parts of water, 10 parts of alcohol, and also in volatile oils and copaiba. Aqueous solutions are alklaine in reaction, and are decomposed by acids.

Action and Uses.—Hexamethylenamine, when taken internally, is decomposed in the kidneys, increasing the normal acidity of the urine, and, if alkaline, rendering it acid, and also acting as an antiseptic. In addition to its acidifying and antiseptic action, the chemical is a solvent for uric acid. It is used as a genito-urinary antiseptic in *pyelitis*, *phosphaturia*, and specific *urethritis* and *cystitis*. In moderate overdoses or in full doses continued for several days, it produces irritability of the bladder, and in still larger doses may cause hematuria.

Incompatibilities.—It is incompatible with acids, tannin, and corrosive mercuric chloride.

Dose.—0.12 to 0.6 Gm.; 2 to 10 grains.

HOMATROPINÆ HYDROBROMIDUM—Homatropine Hydrobromide

Formula, $C_{16}H_{21}NO_3HBr = 353.49$.

The hydrobromide of an alkaloid prepared synthetically by passing hydrochloric acid gas through a mixture of tropine and mandelic acid. It is a white, crystalline powder, having a bitter taste, and is freely *soluble* in water.

Action and Uses.—Homatropine is rarely administered internally, but in the strength of from 4 to 8 grains to the ounce of distilled water, when dropped into the eye it acts as a powerful mydriatic, the mydriasis lasting only from thirty-six to forty-eight hours. It is used as a mydriatic by oculists and ophthalmic surgeons in refractive work. Its physiological action is closely allied to that of atropine.

Dose.—0.0008 to 0.0004 Gm.; $\frac{1}{80}$ to $\frac{1}{40}$ grain.

HUMULUS—Hops

Family, Moraceæ.

The dried strobiles, fruit of hops, not deprived of any of their lupulin. The common hop plant, *Humulus lupulus,* is a climbing perennial herb, native to Asia, Europe, and North America.

The fruit or strobile is ovate, about $1\frac{1}{4}$ inches (3 cm.) long, consisting of a thin, hairy axis, and many yellowish-green to pale brown, obliquely ovate, membranous scales, enclosing a subglobular achene, which is covered with numerous yellow shining glands (lupulin), which gives to the drug its medicinal properties. The drug contains a large percentage of resin, and also volatile oil, *asparagin, lupulinic acid,* and *tannin.* Its medicinal principles are soluble in alcohol.

Action and Uses.—Hops is an antispasmodic and sedative to the nervous system, and is used internally in *hysteria,* and in *vesical* and *renal irritation.* The strobiles made into a poultice are popular as a household remedy as an application for painful inflammations. There are no official preparations of Hops. The best *method for administering* it is as an infusion.

Dose.—2 to 4 Gm.; $\frac{1}{2}$ to 1 ʒ, in infusion

Official Derivative

Lupulinum (*Lupulin*).—A brownish-yellow, or yellowish-brown resinous, granular powder, consisting of the granular trichomes from hops, having the odor and taste of the drug from which it is derived. It contains *resin, myricin,* and a bitter principle, *lupulinic acid,* but no alkaloid. The drug yields its medicinal properties to boiling water and to alcohol. Its official preparations, the fluidextract and oleoresin, are instantly precipitated, with the formation of a gummy mass, when added to aqueous liquids. The oleoresin is best *administered* in pills or capsules, and the fluidextract either alone or in an emulsion.

Action and Uses.—The action and uses of Lupulin are the same as those stated under humulus.

Dose.—0.6 to 1 Gm.; 10 to 15 grains.

Official Preparations

Fluidextractum Lupulini (*Fluidextract of Lupulin*).—Made with a menstruum of alcohol.

Dose.—0.6 to 1 Cc.; 10 to 16 minims.

Oleoresini Lupulini (*Oleoresin of Lupulin*).

Dose.—0.12 to 0.3 Cc.; 2 to 5 minims.

HYDRARGYRUM—Mercury

Synonym, Quicksilver. *Formula*, Hg = 198.50.

A heavy, shining, silvery-white metal, liquid at ordinary temperature. It is usually obtained by roasting the ore *cinnabar*, but is found to some extent in the metallic state. Cinnabar is a native sulphide of mercury, obtained from mines in California, Mexico, Peru, Spain, Australia, and Japan. At ordinary temperature mercury is a liquid, but when cooled to −39.38° C. (−38.88° F.) it solidifies and crystallizes into octahedrons and needles, which are ductile and malleable. It boils and completely volatilizes into colorless and highly poisonous vapor at 357.25° C. (675.05° F.), and even at ordinary temperature slowly volatilizes. The metal is *insoluble* in cold sulphuric acid, in hot or cold hydrochloric acid, and in all the ordinary solvents, but is *soluble* in nitric acid, even when quite diluted, and in boiling sulphuric acid, and unites directly with chlorine, bromine, and iodine. When heated to near its boiling point in contact with the atmosphere, it forms scales of red mercuric oxide. When triturated with lard, oil of turpentine, sugar, or chalk, it is broken into fine globules, forming a gray powder, and this process, which is known as the extinction of mercury, is used in the manufacture of several official preparations of metallic mercury. It forms two series of compounds, *mercurous* and *mercuric*. The *mercurous salts* form a black precipitate with potassium hydroxide, ammonia, lime water, and the alkali carbonates, a white precipitate with hydrochloric acid, and a greenish-yellow precipitate with potassium iodide. The *mercuric salts* yield a reddish-brown precipitate with potassium or sodium hydroxide in small quantities, a yellow precipitate if added in excess, a white precipitate with ammonia and ammonium carbonate, a reddish-brown precipitate with potassium or sodium carbonate, a yellow precipitate with lime water, and a scarlet-red precipitate, soluble in an excess, with potassium iodide.

Action and Uses.—All salts and compounds of mercury are poisonous, the soluble salts acting with greater rapidity than the insoluble compounds. The mercuric salts are more highly toxic than the mercurous. With the exception of calomel, all salts of mercury are irritants to the skin and mucous membranes. The *poisonous symptoms of mercury* are exhibited in two forms, those seen after swallowing the soluble or corrosive salts, characterized by violent gastro-enteritis, and those symptoms observed from the absorption of mercury, taken by the mouth or from its local use.

Poisoning from the absorption of mercury is known as *salivation* or *ptyalism*, the symptoms of which are tenderness, bleeding, and swelling of the gums, loosening of the teeth, swelling of the tongue, foul odor of the breath, profuse flow of saliva from the mouth, dribbling over the chin and chest, a peculiar cachexia, and prostration. Individuals having once been salivated are thereafter very susceptible to the

influence of the mercury. The preparations and salts of mercury are used as a *purge*, as an *antisyphilitic*, as a *disinfectant*, and as an *antiphlogistic*. All are antisyphilitics; calomel, blue mass, and gray powder are also purgatives, corrosive sublimate is also an antiseptic, disinfectant, germicide, and parasiticide; red mercuric oxide, yellow mercuric oxide, and blue ointment are also parasiticides.

The *antidote* to soluble mercury compounds is the white of eggs; which form with mercury sparingly soluble albuminate, but if administered in excess redissolves it and permits ready absorption.

The official preparations and salts of mercury are as follows:

Preparations Containing Metallic Mercury

Hydrargyrum Cum Creta (*Mercury with Chalk*). *Synonym*, Gray Powder.—A light gray, rather damp powder, free from grittiness. Made by extinguishing 38 Gm. of Mercury with 10 Gm. of Clarified Honey and 57 Gm. of Prepared Chalk. It is *used* as a laxative, a stimulant to the liver, and an antisyphilitic.

Dose.—0.06 to 0.6 Gm.; 1 to 10 grains.

Massa Hydrargyri (*Mass of Mercury*). *Synonym*, Blue Mass.—Made by extinguishing 33 Gm. of Mercury with 33 Gm. of Honey of Rose and 9 Gm. of Glycerin, and making into a mass with 10 Gm. of Powdered Glycyrrhiza and 15 Gm. of Powdered Althea. It is usually *employed* as a purgative and hepatic stimulant.

Dose.—0.2 to 0.6 Gm.; 3 to 10 grains.

Emplastrum Hydrargyri (*Mercurial Plaster*).—Made by extinguishing 30 Gm. of Mercury with 1 Gm. of Oleate of Mercury, and incorporating it with 10 Gm. of Hydrous Wool-fat and 59 Gm. of melted Lead Plaster. It is *used* as a local application in the treatment of *syphilis*.

Unguentum Hydrargyri (*Mercurial Ointment*).—Made by extinguishing 50 Gm. of Mercury with 2 Gm. of Oleate of Mercury, and then adding 23 Gm. of Prepared Suet and 25 Gm. of Benzoinated Lard melted together and partially cooled. *Used* in making blue ointment.

Unguentum Hydrargyri Dilutum (*Blue Ointment*).—Made by mixing together 67 Gm. of Mercurial Ointment with 33 Gm. of Petrolatum. *Used* locally as an antisyphilitic and as a parasiticide. It should not be forgotten that when used locally mercury may be absorbed and ptyalism follow.

Official Chlorides of Mercury

Hydrargyri Chloridum Mite (*Mild Mercurous Chloride*). *Synonym*, Calomel. *Formula*, HgCl = 233.68.—A heavy, white, impalpable powder, odorless, tasteless, permanent in air, *insoluble* in ordinary solvents, and volatilized without fusion when strongly heated. It is made by triturating mercuric sulphate with mercury to form mercurous sulphate, and subliming this with sodium chloride. It throws down a

black precipitate with lime water, solution of alkali hydroxide, and with water of ammonia. It is said to form small quantities of corrosive mercuric chloride in the presence of moisture when triturated with antipyrine.

Action and Uses.—Internally, mild mercurous chloride is a *purgative, hepatic stimulant, antiphlogistic,* and *antisyphilitic.* Locally, it is a mild antiseptic *drying powder* and sedative. When used internally as a purge it should be followed by a Seidlitz Powder, magnesium sulphate, or some other saline purge, to insure its elimination and thereby prevent salivation. Triturated with lime water in the proportion of 7.5 Gm. of Calomel, and 1000 Cc. of Lime Water, it forms the well-known *Black Wash,* popular as a local application to *venereal sores.*

Incompatibilities.—Calomel is in part changed to yellow mercurous iodide by alkali iodides, thymol, iodides, and iodoform; the soluble bromides also react with it; in a mixture it is changed to black mercurous oxide by potassium, sodium, and calcium hydroxide, ammonia water, and ammonium carbonate. It is reduced to metallic mercury by spirit of nitrous ether, hypophosphorous acid, and, in the presence of alkalies, by arsenites and antimony, and potassium tartrate.

Dose.—0.06 to 0.6 Gm.; 1 to 10 grains, either in divided doses or in a single dose.

Hydrargyri Chloridum Corrosivum (*Corrosive Mercuric Chloride*). *Synonym,* Corrosive Sublimate, Bichloride of Mercury, Mercuric Chloride. *Formula,* $HgCl_2$ = 268.86.—Corrosive mercuric chloride occurs in heavy, crystalline masses, permanent in air, and having an acrid, persistent, metallic taste. When powdered it is *soluble* in 13 parts of water, 3 parts of alcohol, and about 14 parts of glycerin. Its aqueous solution has an acid reaction with blue litmus paper, which becomes neutral upon the addition of sodium chloride. With water of ammonia an aqueous solution throws down a white precipitate, and with silver nitrate a white precipitate, and with potassium iodide a red precipitate, soluble in an excess of the reagent. With albumin it forms an insoluble compound, which is redissolved by an excess of albumin; this change is prevented by tartaric, citric, and hydrochloric acids. Corrosive mercuric chloride is made by subliming mercuric sulphate with sodium chloride.

Action and Uses.—Corrosive mercuric chloride is extensively employed as an *antiseptic* and *disinfectant;* in aqueous solutions a small quantity of citric or tartaric acid is added to prevent chemical changes from occurring when it is brought in contact with the serum albumin of the tissues. Manufacturers and pharmacists prepare tablets, each containing 0.5 Gm. ($7\frac{1}{2}$ grains) of corrosive sublimate, mixed with tartaric or citric acid, which are convenient for making antiseptic solutions. A tablet dissolved in 500 Cc. (1 pint) of distilled water furnishes a 1 to 1000 solution of the chemical in water. Corrosive mercuric chloride is used internally as an antisyphilitic and antiphlogistic. The chemical is an astringent, an irritant, and in overdoses

a corrosive poison. "*Yellow Wash*," a popular, though unofficial lotion, used to promote healing of sluggish venereal sores, is made by dissolving 3 Gm. (45 grains) of Corrosive Mercuric Chloride in 35 Cc. (9 f℥) of Boiling Water, and adding a sufficient quantity of Lime Water to make 1000 Cc.

Incompatibilities.—In addition to the incompatibilities already named under mercury, corrosive sublimate precipitates from aqueous solution many alkaloidal salts, neutral principles, bitter principles, glucosides, tannic acid, vegetable extractive matter, antimony, and potassium tartrate, and is reduced by hypophosphorous acid, copper, zinc, and iron, salts of arsenic, and so many other substances as to make it advisable, as a rule, not to attempt to combine it in prescription with other drugs.

Dose.—0.002 to 0.004 Gm.; $\frac{1}{32}$ to $\frac{1}{16}$ grain.

Official Iodides of Mercury

Hydrargyri Iodidum Flavum (*Yellow Mercurous Iodide*). *Synonyms*, Green Iodide of Mercury, Protiodide of Mercury, Mercurous Iodide. *Formula*, HgI = 324.40.—Yellow mercurous iodide occurs as a heavy, bright yellow, amorphous powder. It is usually made by precipitating an acid solution of mercurous nitrate with potassium iodide. It is without taste or odor, almost entirely *insoluble* in water, insoluble in alcohol, and ether. By exposure to light it gradually changes color, becoming darker in proportion as it undergoes decomposition into metallic mercury and mercuric iodide.

Action and Uses.—Yellow mercuric iodide is used almost exclusively in the treatment of *syphilis*, it is milder and less irritating than red mercuric iodide.

Incompatibilities.—See *Mercury*. In solutions of iodides it decomposes, forming metallic mercury and mercuric iodide. By heavy metals it is reduced to metallic mercury.

Dose.—0.01 to 0.03 Gm.; $\frac{1}{6}$ to $\frac{1}{2}$ grain.

Hydrargyri Iodidum Rubrum (*Red Mercuric Iodide*). *Synonym*, Biniodide of Mercury. *Formula*, HgI_2 = 450.30.—Red mercuric iodide occurs in a heavy, scarlet-red amorphous powder. It is usually made by mixing aqueous solutions of corrosive mercuric chloride and potassium iodide, and collecting, washing, and drying the resultant precipitate. It is odorless, tasteless, permanent in air, almost *insoluble* in water, *soluble* in 116 parts of alcohol, 85 parts of ether, and also soluble in solutions of soluble iodides, mercuric chloride, sodium theosulphate.

Action and Uses.—Red mercuric iodide is used almost exclusively in the treatment of *syphilis*, but also to a limited extent in ointments as a *counterirritant*. It is more highly toxic and more irritating to mucous membranes than yellow mercurous iodide. Its incompatibilities are practically the same as those stated under Corrosive Mercuric Chloride.

Dose.—0.002 to 0.003 Gm.; $\frac{1}{30}$ to $\frac{1}{20}$ grain.

Official Preparation of Red Mercuric Iodide

Liquor Arseni et Hydrargyri Iodidi (*Solution of Arsenous and Mercuric Iodides*). *Synonym,* Donovan's Solution.—An aqueous solution containing 1 per cent. each of Arsenous Iodide and Red Mercuric Iodide.

Dose.—0.06 to 0.2 Cc.; 1 to 3 minims.

Official Oxides of Mercury

Hydrargyri Oxidum Flavum (*Yellow Mercuric Oxide*). *Formula,* HgO = 214.38.—Yellow mercuric oxide is a light yellow, amorphous, impalpable powder, made by precipitating a solution of corrosive mercuric chloride with sodium hydroxide. It has a somewhat metallic taste, is almost entirely *insoluble* in alcohol and water, and is darkened by exposure to light.

Action and Uses.—Yellow mercuric oxide is an *antiseptic* and *antisyphilitic;* locally applied it is irritating to the skin and mucous membranes, although far less so than red mercuric oxide. The official ointment is used locally in the treatment of *syphilitic ulcers,* but its strength should usually be reduced by the addition of lard or petrolatum. An extemporaneous ointment containing about 1 grain of the salt to 1 dram of petrolatum is popular as a local application in the treatment of *conjunctivitis.*

Hydrargyri Oxidum Rubrum (*Red Mercuric Oxide*). *Synonym,* Red Precipitate. *Formula,* HgO = 214.38.—Red mercuric oxide is a heavy, orange-red, crystalline powder, also crystalline scales, made by decomposing mercuric nitrate by heat. It has a somewhat metallic taste, almost *insoluble* in water, entirely insoluble in alcohol.

Action and Uses.—The salt of mercury is more highly irritating to the skin and mucous membranes than the yellow oxide. The official ointment and also the salt mitigated with an equal quantity of starch or some other inert powder, is used upon foul *syphilitic ulcers* to stimulate healthy granulation. It is used in making the ointment of red mercuric oxide.

Official Preparations of Yellow Mercuric Oxide

Unguentum Hydrargyri Oxidi Flavi (*Ointment of Yellow Mercuric Oxide*).—Made by triturating 10 Gm. of Yellow Mercuric Oxide with 10 Gm. of Water and incorporating with 40 Gm. of Hydrous Wool-fat and 40 Gm. of Petrolatum.

Oleatum Hydrargyri (*Oleate of Mercury*).—Made by dissolving 25 Gm. of Yellow Mercuric Oxide by the aid of heat in 75 Gm. of Oleic acid.

Official Preparation of Red Mercuric Oxide

Unguentum Hydrargyri Oxidi Rubri (*Ointment of Red Mercuric Oxide*).—Made by triturating 10 Gm. of Red Mercuric Oxide with 10

Gm. of Water and incorporating with 40 Gm. of Hydrous Wool-fat and 40 Gm. of Petrolatum.

Official Nitrates of Mercury

Liquor Hydrargyri Nitratis (*Solution of Mercuric Nitrate*).—Solution of Mercuric Nitrate is a clear, nearly colorless, highly corrosive liquid, containing about 50 per cent. of mercuric nitrate and about 11 per cent. of free nitric acid in water. It is made by dissolving 40 Gm. of Red Mercuric Oxide in 45 Gm. of Nitric Acid and 15 Gm. of Distilled water.

Action and Uses.—This highly corrosive liquid is used with caution as a caustic for removing *warts,* and *epitheliomata* and for cauterizing *venereal sores.* It is never administered internally.

Unguentum Hydrargyri Nitratis (*Ointment of Mercuric Nitrate*). *Synonym,* Citrine Ointment.—A light yellow ointment made by treating hot lard with nitric acid, cooling to just above the melting point, and then incorporating a solution of mercuric nitrate.

Action and Uses.—It is used in the treatment of *chronic skin diseases.* The official ointment is too strong for general use, and should be reduced by some ointment basis when prescribed.

Ammoniated Mercury

Hydrargyrum Ammoniatum (*Ammoniated Mercury*). *Synonym,* White Precipitate. *Formula,* $HgNH_2Cl$ = 249.61.—Ammoniated mercury occurs in white, pulverulent pieces, or as a white amorphous powder, made by precipitating an aqueous solution of corrosive mercuric chloride with ammonia water. It is *insoluble* in water or alcohol. It is highly irritating to the skin and mucous membranes, and is used in making Ointment of Ammoniated Mercury.

Official Preparation of Ammoniated Mercury

Unguentum Hydrargyri Ammoniati (*Ointment of Ammoniated Mercury*).—Made by incorporating 10 Gm. of Ammoniated Mercury with 50 Gm. of White Petrolatum and 40 Gm. of Hydrous Wool-fat. *Used* locally as a stimulant in the treatment of *chronic skin diseases.*

HYDRASTIS—Hydrastis

Synonym, Golden Seal. *Family,* Ranunculaceæ.

The dried rhizome and roots of *Hydrastis canadensis,* yielding upon assay not less than 2.5 per cent. of hydrastine. The plant furnishing this drug is a perennial herb, native to North America and Canada, growing to a height of from 6 to 12 inches (15 to 30 cm.) high. The rhizome is subcylindrical, straight or somewhat tortuous, 1 to 2 inches

(2.5 to 5 cm.) long, and $\frac{1}{8}$ to $\frac{1}{4}$ inch (3 to 6 mm.) thick; externally brownish-gray or yellowish-brown; internally deep yellow, and having a central pith. The roots are thin, brittle, and have a thick, yellowish bark. It depends for its activity upon an alkaloid, *hydrastine*, and contains in addition *berberine* and *canadine* (*xanthopuccine*), fixed oil, starch, gum, sugar, and coloring matter.

Action and Uses.—Hydrastis in medicinal doses is a bitter tonic, antiperiodic, and a stimulant to the mucous membrane. It is *used* in the treatment of *gastro-intestinal catarrh, catarrhal jaundice, leucorrhœa,* and in *specific urethritis*. Infusions made of the drug and aqueous solutions of hydrastine are used locally as a *stimulant to mucous membranes* and to check abnormal secretions from them. Preparations of the drug are precipitated by ordinary alkaloidal reagents.

Official Preparations and Derivative

Fluidextractum Hydrastis (*Fluidextract of Hydrastis*).—Made with a menstruum of 6 parts of Alcohol, 3 parts of Water, and 1 part of Glycerin. Each 100 Cc. should contain 2 Gm. of hydrastine.

Dose.—0.3 to 2 Cc.; 5 to 30 minims.

Tinctura Hydrastis (*Tincture of Hydrastis*).—Made by percolating 20 Gm. of Hydrastis with a menstruum of 65 parts of Alcohol and 35 parts of Water to make 100 Cc. of tincture. Each 100 Cc. of the tincture should contain 0.4 Gm. of hydrastine.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Glyceritum Hydrastis (*Glycerite of Hydrastis*).—Made by percolating 1000 Gm. of Hydrastis with Alcohol until the drug is exhausted, evaporating to a thick, concentrated liquid, pouring in 500 Cc. of ice-cold water, filtering, adding enough Water through the filter to make 500 Cc., and lastly adding 500 Cc. of Glycerin to make 1000 Cc. of the finished product.

It will be noted that this preparation is of the same strength as the fluidextract. It is administered internally, and is also popular as a local application.

Dose.—0.3 to 2 Cc.; 5 to 30 minims.

Hydrastina (*Hydrastine*). *Formula,* $C_{21}H_{21}NO_6$ = 380.32.—A white, crystalline alkaloid, permanent in air, *insoluble* in water at ordinary temperature, *soluble* in 135 parts of alcohol, and having a bitter taste. In *poisonous doses*, it produces muscular twitching, followed by tonic and clonic convulsions, and this by paralysis; death resulting from respiratory failure. It is usually *employed* as a local application in the treatment of *subacute* and *chronic inflammation of mucous membranes*.

Dose.—0.01 to 0.03 Gm.; $\frac{1}{6}$ to $\frac{1}{2}$ grain.

Hydrastininæ Hydrochloridum (*Hydrastinine Hydrochloride*). *Formula,* $C_{11}H_{11}NO_2.HCl$ = 223.88.—A light yellow or yellowish-white crystalline powder, having a bitter taste, freely *soluble* in water and alcohol. It is the hydrochloride of an artificial alkaloid derived from

hydrastine. In medicinal doses, it increases the pulse force by stimulating the heart muscle, slows the pulse by stimulating the pneumogastric nerves, and raises arterial tension by its action upon the heart, and also by contracting the bloodvessels. In poisonous doses, it depresses the motor side of the cord, and produces paralysis. It is given internally to control *uterine hemorrhage*, and is looked upon as a powerful oxytoxic.

Dose.—0.03 to 0.06 Gm.; ½ to 1 grain.

HYOSCYAMUS—Hyoscyamus

Synonym, Henbane. *Family*, Solanaceæ.

Hyoscyamus is the dried leaves and flowering tops of *Hyoscyamus niger*, a biennial herb native to Europe, Asia, naturalized in North America, and cultivated in England, collected from plants of the second year's growth, and yielding not less than 0.08 per cent. of mydriatic alkaloid.

The leaves are ovate-oblong, 2 to 10 inches (5 to 25 cm.) long, 1 to 4 inches (2.5 to 10 cm.) broad, coarsely toothed or lobed, grayish-green, glandular-hairy or woolly, particularly on lower surface. The flowers are urn-shaped, a straw color, yellowish when in a fresh state. The fruit is capsular, 2-celled, and enclosed in the calyx; odor heavy, narcotic. Powdered hyoscyamus is greenish-gray. The drug contains *hyoscyamine, hyoscine, hyoscypicrin*, chlorophyll, mucilage, and extractive. It yields its virtues to diluted alcohol, and also partially to boiling water.

Action and Uses.—Hyoscyamus is a narcotic, antispasmodic, nervous sedative, vasomotor stimulant, mydriatic, and checks secretions from the skin, mucous membrane, and mammary glands. Its action is quite similar to that of belladonna, except that it is less powerful and perhaps more of a sedative to the nervous system. In *overdoses*, it gives rise to symptoms similar to those stated under belladonna. Some of the more frequent *uses* of the drug is, as a stimulant to the vasomotor system in *arterial relaxation*, as an antispasmodic in *whooping cough, asthma, irritability of the bladder, gastralgia*, particularly when due to gastric ulcers, and as an ingredient in purgative pills *to prevent griping*. *Hyoscyamine* is used in the eye as a mydriatic, its period of mydriasis being briefer than that produced by atropine and longer than that produced by homatropine. *Hyoscine* is used as a *sedative* to the nervous system.

Dose.—0.12 to 0.6 Gm.; 2 to 10 grains.

Official Preparations and Derivatives

Extractum Hyoscyami (*Extract of Hyoscyamus*).—An extract of a pilular consistency, containing not less than 0.3 per cent. of mydriatic alkaloids of Hyoscyamus. Made by evaporating the fluidextract.

Dose.—0.03 to 0.12 Gm.; ½ to 2 grains.

Fluidextractum Hyoscyami (*Fluidextract of Hyoscyamus*).—Made with a menstruum of 2 parts of Alcohol and 1 part of Water. Should contain not less than 0.075 Gm. of mydriatic alkaloids from hyoscyamus in 100 Cc. of fluidextract.

Dose.—0.12 to 0.6 Cc.; 2 to 10 minims.

Tinctura Hyoscyami (*Tincture of Hyoscyamus*).—Made by percolating 10 Gm. of Hyoscyamus with Diluted Alcohol to make 100 Cc. of tincture. Should contain not less than 0.007 Gm. of mydriatic alkaloids from hyoscyamus in 100 Cc. of tincture.

Dose.—1.2 to 6 Cc.; 20 to 100 minims.

Hyoscyaminæ Hydrobromidum (*Hyoscyamine Hydrobromide*). *Formula,* $C_{17}H_{23}NO_3.HBr = 367.40$.—The hydrobromide of an alkaloid obtained from *Hyoscyamus* and other plants of the Solanaceæ family. White, prismatic crystals, having an acrid, nauseous, and bitter taste; deliquescent upon exposure to air.

Dose.—0.0005 to 0.0008 Gm.; $\frac{1}{120}$ to $\frac{1}{80}$ grain.

Hyoscyaminæ Sulphas (*Hyoscyamine Sulphate*). *Formula,* $(C_{17}H_{23}NO_3)_2.H_2SO_4 = 671.43$.—The neutral sulphate of an alkaloid obtained from *Hyoscyamus* and other plants of the Solanaceæ family. It occurs in white, indistinct crystals, or a white powder, deliquescent when exposed to air.

Action and Uses.—Both salts of hyoscyamine have practically the same action and are used for the same purposes as atropine, except that they are more sedative to the nervous system, and when used as a mydriatic the period of mydriasis is of more brief duration than that from atropine. The strength for use in the eye as a mydriatic is 2 grains (0.12 Gm.) of hyoscyamine in 1 f℥ (30 Cc.) of distilled water.

Dose.—0.0005 to 0.0008 Gm.; $\frac{1}{120}$ to $\frac{1}{80}$ grain.

Hyoscinæ Hydrobromidum (*Hyoscine Hydrobromide*). *Formula,* $C_{17}H_{21}NO_4HBr + 3H_2O = 434.92$.—A colorless, crystalline, slightly efflorescent salt of an alkaloid derived from *Hyoscyamus* and other plants of the Solanaceæ family. Chemically, it is identical with scopolamine.

Action and Uses.—Hyoscine sedates the brain and induces sleep, but is uncertain in its action; dryness of the mouth, mydriasis, and sometimes delirium result from its administration. It is *used* in *insomnia, acute mania, hysteria,* and more recently has been recommended to relieve the distressing symptoms arising during the withdrawal of opium from persons addicted to the use of that drug. The alkaloid is also used in the eye as a mydriatic.

Dose.—0.0005 to 0.0008 Gm.; $\frac{1}{120}$ to $\frac{1}{80}$ grain.

IODIDES

Potassium, Sodium, Ammonium, and Strontium iodides, known as the *alkali iodides,* furnish a convenient means of administering

iodine. They are white or colorless, crystalline salts, having a bitter, saline taste, are more or less deliquescent, freely *soluble* in water, and are used as alteratives, as antisyphilitics, antirheumatics, in asthma, aneurysm, arteriosclerosis, atheroma, to promote absorption of abnormal exudates, and in chronic metallic poisoning. When given internally in full doses, they give rise to a chain of symptoms known as *iodism*, characterized by coryza, painful acne, and nausea. In the presence of mineral acids, they liberate iodine. Syrup of hydriodic acid, though less powerful, is used for the same purpose as the alkali iodides. The iodides of arsenic and mercury, in addition to the alterative effect of iodine, possesses tonic properties. Zinc and lead iodides are astringent and alterative in action, while the only other official iodide, sulphur iodide, is probably not a true chemical salt, but a compound of sulphur and iodine. Ointments containing sulphur iodide in the strength of from 10 to 30 per cent. are used locally as stimulants or caustics, according to their strength, in the treatment of *chronic skin diseases*.

Alkali Iodides

Ammonii Iodidum (*Ammonium Iodide*). *Formula*, NH_4I = 143.83.—A white, granular powder, or minute, colorless, cubical crystals, having a sharp, saline taste. It is rather an unstable salt, and, upon exposure to air and light, loses ammonia, liberates iodine, becomes yellow or yellowish-brown. It is deliquescent, *soluble* in 0.6 part of water, and 9 parts of alcohol.

Dose.—0.1 to 0.3 Gm.; 2 to 5 grains or more.

Potassii Iodidum (*Potassium Iodide*). *Formula*, KI = 164.76.—Colorless, transparent, or opaque white, cubical crystals, or white, granular powder, having a pungent, afterward bitter taste. It is permanent in dry air, but slightly deliquescent in moist air. It is *soluble* in 0.7 part of water, in about 12 parts of alcohol, and in 2.5 parts of glycerin.

Dose.—0.3 to 2 Gm.; 5 to 30 grains or more.

Sodii Iodidum (*Sodium Iodide*). *Formula*, NaI = 148.78.—Colorless, cubical crystals, or white, crystalline powder, having a saline or slightly bitter taste. In moist air it deliquesces and becomes brown; *soluble* in about 0.5 part of water, and 3 parts of glycerin.

Dose.—0.3 to 2 Gm.; 5 to 30 grains or more.

Strontii Iodidum (*Strontium Iodide*). *Formula*, $SrI_2 + 6H_2O$ = 446.02.—Colorless, transparent, hexagonal plates, having a bitter, saline taste. It deliquesces, and is colored yellow upon exposure to air and light; is *soluble* in 0.5 part of water, and also soluble in alcohol, and slightly so in ether.

Dose.—0.3 to 2 Gm.; 5 to 30 grains or more.

Syrupus Acidi Hydriodici (*Syrup of Hydriodic Acid*).—A transparent colorless or not more than pale straw-colored liquid, having a sweet

and acidulous taste, containing about 1 per cent. by weight, of absolute Hydriodic Acid. It is made by mixing together 10 Gm. of Diluted Hydriodic Acid, 30 Gm. of Water, and 600 Gm. of Syrup.

Dose.—2 to 16 Cc.; $\frac{1}{2}$ to 4 f℥.

Metallic Iodides

Arseni Iodidum (*Arsenous Iodide*).—See *Arsenic.*

Dose.—0.002 to 0.006 Gm.; $\frac{1}{30}$ to $\frac{1}{10}$ grain.

Hydrargyri Iodidum Flavum (*Yellow Mercurous Iodide*).—See *Mercury.*

Dose.—0.01 to 0.03 Gm.; $\frac{1}{6}$ to $\frac{1}{2}$ grain.

Hydrargyri Iodidum Rubrum (*Red Mercuric Iodide*).—See *Mercury.*

Dose.—0.002 to 0.006 Gm.; $\frac{1}{30}$ to $\frac{1}{10}$ grain.

Pilulæ Ferri Iodidi (*Pills of Ferrous Iodide*).—See *Ferrum.*

Dose.—1 to 3 pills.

Syrupus Ferri Iodidi (*Syrup of Ferrous Iodide*).—See *Ferrum.*

Dose.—0.3 to 2 Cc.; 5 to 30 minims.

Zinci Iodidum (*Zinc Iodide*).—See *Zinc.*

Dose.—0.03 to 0.12 Gm.; $\frac{1}{2}$ to 2 grains.

Sulphuris Iodidum (*Sulphur Iodide*).—See *Sulphur.*

Dose.—0.015 to 0.06 Gm.; $\frac{1}{4}$ to 1 grain.

Plumbi Iodidum (*Lead Iodide*).—See *Plumbum.*

Dose.—0.03 to 0.12 Gm.; $\frac{1}{2}$ to 2 grains.

IODOFORMUM—Iodoform

Formula, $CHI_3 = 390.61$.

Iodoform is a fine, lemon-yellow powder or lustrous crystals, yielding about 96 per cent. of iodine, having a distinctive, penetrating, and persistent odor, and a slightly sweetish, iodine-like taste; usually obtained by the action of iodine upon alcohol in the presence of an alkali or an alkali carbonate. It is *sparingly soluble* in water, in about 46 parts of alcohol, in 5.2 parts of ether, and is also soluble in chloroform and fixed and volatile oils. It volatilizes slowly upon exposure at ordinary temperature, and fuses at 115° C. (239° F.). Its odor may be partially disguised by oils of peppermint, fennel, and anise, and by Peruvian balsam. Powdered coffee is also said to be of value for disguising the odor.

Action and Uses.—Upon mucous membranes and abrasions, iodoform acts as a feeble anesthetic and antiseptic. Its greatest field of usefulness is as a local application, in ointments or powdered form, in the treatment of *burns* and *syphilitic and tubercular ulcers*. Ordinarily, not more than one dram should be applied at a single dressing over a large abrasion or ulcer, as its absorption in many cases produced

poisonous symptoms. The drug is sometimes given internally in *gastro-intestinal catarrh.*

Incompatibilities.—Iodoform is incompatible with alkalies, silver nitrate, calomel, and tannic acid.

Dose.—0.06 to 0.3 Gm.; 1 to 5 grains.

Official Preparation

Unguentum Iodoformi (*Iodoform Ointment*).—Made by incorporating 10 Gm. of Iodoform with 90 Gm. of Lard.

Used locally.

IODOLUM—Iodol

Formula, $C_4I_4.NH$ = 566.17.

A light, grayish-brown, crystalline powder, yielding about 88 per cent. of iodine, without odor or taste, obtained by the action of iodine upon pyrrol in the presence of alcohol. It is very *sparingly soluble* in water, *soluble* in 9 parts of alcohol, 1.5 parts of ether, 105 parts of chloroform, and also in fixed oils. It is not volatilized at ordinary temperatures, but if heated to about 140° or 150° C. (284.32° F.) it is decomposed with the liberation of violet vapor of iodine.

Action and Uses.—The drug is used in the same way, and in the same class of cases as iodoform; and while possessing the great advantage of being free from odor, does not relieve pain to the same extent. Internally, it is used in the treatment of *tertiary syphilis* and *diabetes.*

Dose.—0.06 to 0.3 Gm.; 1 to 5 grains.

IODUM—Iodine

Formula, I = 125.90.

Iodine is a non-metallic element found in seaweeds, sea water, in mineral springs, Chile saltpetre, some minerals, and in the free state in Wood Hall Spar Spring, at Lincoln, Nebraska. It is also present in the thyroid gland of sheep. It is prepared commercially from the mother liquor of *Chile saltpetre* (sodium iodate) and from *kelp,* which is the ash of seaweeds. Iodine is in bluish-black, scale-like, rhombic plates, having a metallic luster, a distinct, characteristic odor, and a caustic, acrid taste. It has neither an acid nor an alkaline reaction; is *soluble* only in about 5000 parts of water, but dissolves in 10 parts of alcohol and in 60 parts of glycerin, is freely soluble in chloroform, ether, and carbon disulphide. Its solubility in water may be greatly increased by the presence of soluble iodides and tannin. It slowly volatilizes at ordinary temperatures, and when heated to about 114° C. (237.2° F.) melts, and is dissipated in the form of blue vapor. When brought in contact with boiled starch, a dark, deep blue color is pro-

duced. Iodine enters directly into combination with alkalies and many metals forming iodides.

Action and Uses.—Ointments or alcoholic solutions, when locally applied to the skin and mucous membrane, stain them, give rise to a sensation of warmth or burning pain, depending upon the degree of its concentration, followed by redness and some swelling of the surrounding tissues, a part of the iodine so applied being absorbed. Free or frequent application of ointments or alcoholic solutions of iodine to the skin cause irritation, fissuring, and exfoliation of the epidermis, and, if the area is great, a sufficient quantity may be absorbed to induce headache. Internally, well diluted iodine is an alterative; in concentrated form, it is a violent irritant and caustic, producing gastro-enteritis. Ointments and solutions of iodine are applied locally as *counterirritants*, to bring about absorption of abnormal exudates in *pleurisy*, *hydrocele*, *synovitis*, and similar conditions. It is also looked upon with favor in the treatment of *ringworm*. Internally, the tincture and compound solution are administered to bring about absorption of abnormal exudates, and also to relieve *vomiting;* when administered, they should be well diluted with water. Poisoning by iodine may be relieved by the free administration of boiled starch.

Incompatibilities.—Iodine in solution is decolorized by aqueous solutions of potassium and sodium hydroxide, and also by ammonia water. Under certain circumstances, when solutions of iodine and ammonia water are mixed a dark precipitate forms, which in the dry state is violently explosive. In alcoholic solution, it precipitates most alkaloids. Fixed oils enter into chemical combination with iodine; volatile oils combine with iodine energetically, often with the development of heat, iodine being in part volatilized. Boiled starch enters into chemical combination with iodine, developing a blue color.

Official Preparations

Liquor Iodi Compositus (*Compound Solution of Iodine*). *Synonym*, Lugol's Solution.—Made by dissolving 5 Gm. of Iodine, and 10 Gm. of Potassium Iodide in a sufficient quantity of Water to make 100 Cc.

Dose.—0.3 to 1 Cc.; 5 to 16 minims.

Tinctura Iodi (*Tincture of Iodine*).—Made by dissolving 7 Gm. of Iodine and 5 Gm. of Potassium Iodide in a sufficient quantity of Alcohol to make 100 Cc. Used locally. Rarely administered internally.

Dose.—0.2 to 0.3 Cc.; 3 to 5 minims.

Unguentum Iodi (*Iodine Ointment*).—Made by triturating 4 Gm. of Iodine and 4 Gm. of Potassium Iodide with 12 Gm. of Glycerin, and incorporating with 80 Gm. of Benzoinated Lard. The use of a metallic spatula should be avoided.

Used locally.

IPECACUANHA—Ipecac

Family, Rubiaceæ.

Ipecac is the dried root and portion of the stem of *Cephaëlis Ipecacuanha,* or of *Cephaëlis acuminata,* the former known as *Rio Ipecac* and the latter as *Carthagena Ipecac;* containing not less than 1.75 per cent. of Ipecac alkaloids.

Rio Ipecac is a shrubby, perennial herb, having a stem about 24 to 26 inches long, 12 to 18 inches of which is erect and above ground, and 10 to 12 inches under ground. The dried roots, which are official, are irregular lengths, varying from 4 to 10 inches (10 to 25 cm.) long, $\frac{1}{6}$ inch (4 mm.) thick, simple or branched, contorted, reddish-brown, blackish-brown, or grayish-brown, closely annulated, with thickened incomplete rings, and usually exhibiting transverse fissures through the bark. The bark is easily separated from the thin, whitish, central woody portion of the root; its odor is slight, but peculiar; its taste bitter and nauseous, and somewhat acrid. The powdered root is sternutatory.

The root of *Carthagena Ipecac* is similar to Rio Ipecac, but is much thicker, dull gray externally, with thinner, merging annulæ; and the fractured surface of the bark is gray, while that of the Rio Ipecac is whitish. Ipecac contains the alkaloids *emetine, cephaëline,* and *psychotrine,* and also *ipecacuanhic acid,* choline, resin, pectin, and starch.

Action and Uses.—Ipecac is an emetic, expectorant, antispasmodic, and hemostatic, and when locally applied an irritant to mucous membranes. When administered in full doses it produces nausea, vomiting, general relaxation, and increases the secretion of the bronchial tube and of the salivary glands. It is *used* in full doses as an *emetic,* in smaller doses to control *vomiting,* in the early stages of *bronchitis* to promote secretion, in *laryngeal* spasms or *false croup* as an antispasmodic, and also in *acute dysentery* and *hemoptysis.* Powder of ipecac and opium, and tincture of ipecac and opium are used as sedatives, expectorants, and diaphoretics.

Dose.—In powdered form, as expectorant, 0.06 to 0.12 Gm.; 1 to 2 grains; as emetic, 1 to 2 Gm.; 15 to 30 grains.

Official Preparations

Fluidextractum Ipecacuanhæ (*Fluidextract of Ipecac*).—Made with a menstruum of 3 parts of Alcohol and 1 part of Water. Each 100 Cc. should contain 1.5 Gm. of alkaloids from Ipecac.

Dose.—As expectorant, 0.06 to 0.2 Cc., 1 to 3 minims; as emetic, 1 to 2 Cc., 15 to 30 minims.

Syrupus Ipecacuanha (*Syrup of Ipecac*).

Composition.—Fluidextract of Ipecac, 7 Cc.; Acetic Acid, 1 Cc.; Glycerin, 10 Cc., with enough Sugar and Water to make 100 Cc. of the finished syrup.

Dose.—As expectorant, 0.6 to 2 Cc., 10 to 30 minims; as emetic, 8 to 16 Cc., 2 to 4 f℥.

Vinum Ipecacuanha (*Wine of Ipecac*).—Made by mixing together Fluidextract of Ipecac, 10 Cc.; Alcohol, 10 Cc.; White Wine, 80 Cc.

Dose.—As expectorant, 0.5 to 2 Cc., 7 to 30 minims; as emetic, 8 to 16 Cc., 2 to 4 f℥.

Pulvis Ipecacuanhæ et Opii (*Powder of Ipecac and Opium*). *Synonym*, Dover's Powder.—Made by triturating together Powdered Ipecac, 10 Gm.; Powdered Opium, 10 Gm.; Sugar of Milk, 80 Gm.

Dose.—0.06 to 1 Gm.; 1 to 15 grains. Very much smaller doses should be administered to children.

Tinctura Ipecacuanhæ et Opii (*Tincture of Ipecac and Opium*).—Made by evaporating over a water-bath, 100 Cc. of Tincture of Deodorized Opium until it weighs 80 Gm., and when it becomes cool adding to it 10 Cc. of Fluidextract of Ipecac, filter, and pass through the filter enough Diluted Alcohol to make 100 Cc. of tincture.

Dose.—0.06 to 1 Cc.; 1 to 15 minims. Very much smaller doses should be administered to children.

JALAPA—Jalap

Family, Convolvulaceæ.

The dried tuberous root of *Exogonium Purga*, a perennial twining herb, native to eastern Mexico, and cultivated in India. The tuberous root, which is official, is napiform, pyriform, about $1\frac{1}{5}$ to 3 inches (3 to 8 cm.) long, $\frac{1}{2}$ to 2 inches (1 to 5 cm.) thick, more or less wrinkled, and dark brown, with numerous concentric circles composed of small resin cells; its taste is sweetish and acrid. The root contains a soft resin, which is soluble in ether, and a hard resin insoluble in ether, also starch, gum, sugar, and coloring matter. The soft resin known as *jalapin* is medicinally inert, the hard resin consists mostly of *convolvulin*, a glucoside and is the purgative principle of the root. Jalap should yield not less than 7 per cent. of total resin, of which not more than 15 per cent. should be soluble in ether.

Action and Uses.—In moderate doses, jalap is a laxative; in full doses, a hydragogue cathartic; in large doses, it gives rise to gastro-enteritis. The drug is used as an active purge to relieve *dropsy* and *cerebral congestion*. Compound Jalap Powder is its most popular official preparation, as it contains cream of tartar in addition to jalap. It is both a purgative and a diuretic, and is particularly applicable as a purgative in *Bright's disease*.

Dose.—In powder, 1 to 2 Gm.; 15 to 30 grains.

Official Preparations

Pulvis Jalapæ Compositus (*Compound Powder of Jalap*).—Made by thoroughly triturating together 35 Gm. of Powdered Jalap and 65 Gm. of powdered Potassium Bitartrate.

Dose.—1 to 3 Gm.; 15 to 45 grains.

Resina Jalapæ (*Resin of Jalap*).—Yellowish or brown masses or fragments, breaking with a resinous, glossy fracture, or a yellowish-gray or yellowish-brown powder, obtained as a precipitate by the addition of water to a strong alcoholic tincture of jalap. It is *soluble* in alcohol, insoluble in water, carbon disulphide, benzene, fixed or volatile oil. Not more than 15 per cent. should be soluble in ether, nor more than 35 per cent. in chloroform. The resin has a slight, peculiar odor, and a somewhat acrid taste.

Used as a purge. It enters into the Composition of Compound Cathartic Pills.

Dose.—0.12 to 0.3 Gm.; 2 to 5 grains.

JUNIPERUS—Juniper Berries

Family, Coniferæ.

The dried fruit of *Juniperus communis,* a large erect evergreen shrub, or small tree growing throughout the United States, Canada, Asia, Europe, and northern Africa. The fruit, which in itself is *not official,* but from which the official oil of juniper is obtained, is a round, dark purplish berry, about $\frac{1}{3}$ inch (8 mm.) broad, containing three seeds, and having a terebinthinate taste. The berries contain volatile oil, sugar, and resin.

Action and Uses.—Juniper berries depend for their activity upon the *oil of juniper,* which is a diuretic, stimulant, carminative, and emmenagogue, and is used in the treatment of *renal dropsy, flatulency,* and *painful menstruation.* The oil is employed in making Spirit of Juniper, and the Compound Spirit of Juniper, which is very similar to *gin,* both of which are more extensively used in the above-named conditions than is the oil.

Official Preparations

Oleum Juniperi (*Oil of Juniper*).—A colorless, faintly green or yellowish volatile oil, having a terebinthinate odor and taste, distilled from juniper berries.

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

Spiritus Juniperi (*Spirit of Juniper*).—Made by dissolving 5 Cc. of Oil of Juniper in 95 Cc. of Alcohol.

Dose.—0.6 to 4 Cc.; 10 to 60 minims.

Spiritus Juniperi Compositus (*Compound Spirit of Juniper*).—Made by dissolving 8 Cc. of Oil of Juniper, 1 Cc. of Oil of Fennel, 1 Cc. of Oil of Caraway, in 1400 Cc. of alcohol, and gradually adding enough Water to make the product measure 2000 Cc.

Dose.—4 to 16 Cc.; 1 to 4 f℥.

KAOLINUM—Kaolin

Synonyms, Porcelain Clay; Fuller's Earth.

A soft, white, or yellowish-white powder, consisting chiefly of aluminum silicate ($H_2Al_2Si_2O_8 + H_2O$), powdered and freed from gritty particles. It is insoluble in the ordinary solvents, in diluted acids, or in alkali hydroxides.

Uses.—Kaolin is chiefly employed in making Cataplasm of Kaolin, but is also used as a *dusting powder* and as a *pill excipient* in such pills as are intended to disintegrate slowly in the gastro-intestinal tract.

Official Preparation

Cataplasma Kaolini (*Cataplasm of Kaolin*).—A smooth, dark gray paste, having about the consistency and appearance of freshly made putty. It attracts moisture upon exposure to the atmosphere, and should, therefore, be kept in an air-tight container. It is prepared by heating 577 Gm. of finely powdered Kaolin in a suitable vessel at 100° C. (212° F.), with occasional stirring for one hour, mixing it intimately with 45 Gm. of finely powdered Boric Acid, incorporating this thoroughly with 375 Gm. of Glycerin, and finally adding 0.5 Gm. of Thymol previously dissolved in 2 Gm. of Methyl Salicylate, and 0.5 Gm. of Oil of peppermint, and making the whole into a homogeneous mass.

Action and Uses.—Cataplasm of Kaolin is exosmotic, and a local sedative. It is *used* as a substitute for flaxseed and other poultices. It may be spread upon fabric and applied to relieve superficial inflammations such as *sprains, boils, synovitis, mastitis,* and *orchitis,* and also *erysipelas.*

KINO—Kino

Family, Leguminosæ.

The inspissated or evaporated juice of *Pterocarpus Marsupium,* a tree growing in the forests of India. The juice is obtained by making incisions into the tree, and collecting the juice in clay cups, bamboo-joints, or other receptacles; it is then boiled down to the consistency of thick extract, impurities being skimmed off during the process of boiling, and then poured into pans in thin layers to dry. The inspissated juice, as it comes into the market, is in small, angular, dark red, shining pieces, which are very astringent and sweetish, and when taken into the mouth colors the saliva a deep red. It is slowly *soluble* in cold water, and readily soluble in alcohol. It contains *kino-tannic acid, kino-red, pyrocatechin,* and gum.

Action and Uses.—Kino is an astringent and hemostatic. It is *used* internally in the treatment of *diarrhœa, dysentery, menorrhagia,* and locally in *leucorrhœa,* and as a gargle in *sore throat.*

Incompatibilities.—It precipitates and blackens preparations of iron; precipitates many metallic and alkaloidal salts from solution The incompatibilities are about the same as those of tannic acid.

Dose.—0.3 to 0.6 Gm.; 5 to 10 grains.

Official Preparation

Tinctura Kino (*Tincture of Kino*).—It contains 5 per cent. of Kino in a menstruum of Glycerin, Alcohol, and Water. If frequently exposed to the air, the tincture has a tendency to gelatinize.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

KRAMERIA—Krameria

Synonym, Rhatany. *Family,* Krameriaceæ.

The dried root of *Krameria triandra, Krameria Ixina,* or *Krameria argentea.* The root, known as *Peruvian Krameria,* is the root obtained from a shrub growing in Peru and Bolivia. As it comes into the market, several root branches are attached to a short, hard and woody tap-root. The roots are about ½ inch (1 cm.) thick, cylindrical, externally red-brown with a pinkish-brown bark, internally yellowish or pinkish-white, finely radiate, and very astringent to the taste. The second variety, known as *Savanilla Krameria,* is the root of a shrub growing in the United States of Colombia and Venezuela, and the third variety known as *Para* or *Brazilian Krameria,* from a shrub of the same family growing in northern Brazil. Brazilian Krameria comes into the market with the root branches detached from the tap-root, and crown externally deep purple or chocolate-brown, the bark and wood both darker than Peruvian Krameria, and the taste more astringent. Savanilla Krameria is similar to but more reddish-purple in color than Brazilian Krameria. The drug depends for its activity upon *krameria, tannic acid,* and in addition contains sugar, starch, gum, and wax.

Action and Uses.—Krameria is astringent and hemostatic. It is *used internally* in the treatment of *diarrhœa, dysentery, gastric* and *intestinal hemorrhage,* and *incontinence of the urine.* It is *used locally* in the treatment of *bleeding and swollen gums, sore throat, epistaxis, gonorrhœa, leucorrhœa.*

Incompatibilities.—The same as tannic acid.

Official Preparations

Extractum Krameriæ (*Extract of Krameria*).—A *dry extract* made by percolating krameria with water, and evaporating.

Dose.—0.3 to 0.6 Gm.; 5 to 10 grains.

Fluidextractum Krameriæ (*Fluidextract of Krameria*).—Made with a menstruum of diluted alcohol.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

Syrupus Krameriæ (*Syrup of Krameria*).—Made by mixing together 45 Cc. of Fluidextract of Krameria and 55 Cc. of Syrup.

Dose.—2 to 8 Cc.; ½ to 2 f℥.

Tinctura Krameriæ (*Tincture of Krameria*).—Made by percolating 20 Gm. of Krameria with Diluted Alcohol to make 100 Cc.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Trochisci Krameriæ (*Troches of Krameria*).—Each troche contains (0.06 Gm.) 1 grain of Extract of Krameria with Sugar, Tragacanth, and Stronger Orange-flower Water.

Dose.—One as required.

LACTUCARIUM—Lactucarium

Synonym, Lettuce Opium. *Family*, Compositæ.

The concrete milk-juice of *Lactuca Virosa*, an herb known as wild lettuce or prickly lettuce, with a brown tap-root, growing wild in western and southern Europe, and cultivated in Europe, England, Germany, and the United States. All parts of the plant contain a milky juice, which exudes when the plant is wounded. The juice is obtained by cutting off the tops of the stalks at commencement of flowering, collecting, and drying by artificial heat. The inspissated juice is in irregular angular pieces or quarter sections of hemispherical masses; externally dull reddish or grayish-brown; internally yellowish or light brown. The outer surface having a waxy luster, and is somewhat porous; odor distinct, opium-like; taste strongly bitter. It is *partially soluble* in ether and in alcohol. Lactucarium contains *lactucin*, *lactucic acid*, and *lacturin*.

Action and Uses.—Lactucarium is a mild sedative to the nervous system, a feeble hypnotic, and an expectorant. It is used internally to relieve *insomnia* and *nervous irritability*, to *allay cough*, and *promote expectoration*.

Dose.—1 to 2 Gm.; 15 to 30 grains.

Official Preparations

Tinctura Lactucarii (*Tincture of Lactucarium*).—Made by exhausting 50 Gm. of Lactucarium previously treated with Purified Petroleum Benzin, with a menstruum of Alcohol, Glycerin, and Water to make 100 Cc. of the tincture.

Dose.—2 to 4 Cc.; ½ to 1 f℥.

Syrupus Lactucarii (*Syrup of Lactucarium*).—Made by mixing together 10 Cc. of Tincture of Lactucarium, and 20 Cc. of Glycerin, then adding 5 Cc. of Orange-flower Water, having dissolved in it 0.1

Gm. of Citric Acid and finally a sufficient quantity of Syrup to make 100 Cc.

Dose.—4 to 12 Cc.; 1 to 3 f℥.

LAPPA—Lappa

Synonym, Burdock. *Family,* Compositæ.

The dried root of *Arctium Lappa,* or other species of *Arctium,* collected from plants of the first year's growth. Burdock is a coarse, biennial weed, growing to the height of 2 to 6 feet, native to Europe and northern Asia, and naturalized in North America, where it grows in waste places, but in rich soil. When first collected, the root is fleshy, but in drying loses about six or seven times its original weight. It comes into the market in very slender, fusiform pieces, about 12 inches (30 cm.) in length, $\frac{4}{5}$ inch (2 cm.) in diameter, annulate at the crown, with a soft whitish cottony tuft; it is sometimes seen in longitudinal slices. Externally, it is grayish or deep brown, longitudinally wrinkled; internally a dark cambium separates the brown bark from the yellowish wood; the centre is hollow or contains a whitish pith-like tissue. It has a mucilaginous and slightly bitter taste. The root contains *inulin,* sugar, gum, *mucilage, tannin,* and *lappin,* but is free from starch.

Action and Uses.—Burdock root is a diuretic and alterative. It is employed to a limited extent in the treatment of *chronic rheumatism, syphilis,* and *scrofula.*

Dose.—2 to 4 Gm.; 30 to 60 grains, in infusion.

Official Preparation

Fluidextractum Lappæ (*Fluidextract of Lappa*).—Made with a menstruum of diluted alcohol.

Dose.—2 to 4 Cc.; 30 to 60 minims.

LAVANDULA—Lavender Flowers

Family, Labiatæ.

The carefully dried flowers of *Lavandula officinalis,* a shrub 1 to 3 feet (0.3 to 1 cm.) high, native to southern Europe, and cultivated in all civilized countries. The flowers are two-lipped, hairy, glandular, lilac-colored, and have a fragrant odor. *Neither the plant nor the flowers are official,* but the fragrant volatile oil obtained by distillation from the latter is official, as are several pharmaceutical preparations made from the oil.

Official Derivative

Oleum Lavandulæ Florum (*Oil of Lavender Flowers*).—A colorless or light yellow, fragrant, volatile oil, obtained by distillation from the fresh flowering tops of *Lavandula officinalis.*

Action and Uses.—The oil of lavender is a carminative, and a stimulating aromatic. Its official preparations are employed as agreeable vehicles.

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

Official Preparations of Oil of Lavender

Spiritus Lavandulæ (*Spirit of Lavender*).—Made by dissolving 5 Cc. of Oil of Lavender Flowers in 95 Cc. of Alcohol.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

Tinctura Lavandulæ Composita (*Compound Tincture of Lavender*).—Made from Oil of Lavender Flowers, Oil of Rosemary, Saigon Cinnamon, Cloves, Myristica, Red Saunders, Alcohol, and Water. This tincture has an attractive reddish color, an agreeable odor, an aromatic taste, and is employed as an *agreeable vehicle* in which to administer many active remedies; it is also a *carminative*.

Dose.—2 to 4 Cc.; 1 to 2 f ʒ.

LEPTANDRA—Leptandra

Synonym, Culver's Root. *Family*, Scrophulariaceæ.

The dried rhizome and roots of *Veronica virginica*, a tall perennial herb, 3 to 6 feet (1 to 2 M.) high, native to eastern and central North America. The rhizome is from 4 to 6 inches (10 to 15 cm.) long, $\frac{1}{6}$ to $\frac{1}{3}$ inch (4 to 8 mm.) thick; externally gray-brown to blackish-brown, with cup-shaped scars on the upper surface. Upon the inferior and lateral surfaces are coarse roots and root scars; internally, bark dark brown, wood hard, yellowish, pith large; the roots are slender, fragile, and longitudinally wrinkled. The drug has a bitter and slightly acrid taste. Leptandra contains a bitter principle, *leptandrin*, which is probably a glucoside, a resin, which is probably inert, volatile oil, tannin, gum, and glucose. The drug yields its medicinal virtues to alcohol. Leptandra of the eclectics is a resinoid made by precipitating a concentrated alcoholic tincture of the drug by the addition of water.

Action and Uses.—Leptandra is a purgative and hepatic stimulant, closely resembling podophyllum in its action. It is *used* as a *laxative* in *hepatic torpor*.

Dose.—0.3 to 2 Gm.; 5 to 30 grains in powder.

Official Preparations

Extractum Leptandræ (*Extract of Leptandra*).—A powdered extract made by evaporating 100 Cc. of Fluidextract of Leptandra to complete dryness and adding enough powdered Glycyrrhiza to make 25 Gm. of the finished product.

Dose.—0.06 to 0.5 Gm.; 1 to 8 grains.

Fluidextractum Leptandræ (*Fluidextract of Leptandra*).—Made with a menstruum of 3 parts of Alcohol and 1 part of Water.

This fluidextract is instantly precipitated by the addition of water.

Dose.—0.03 to 2 Cc.; 5 to 30 minims.

LIMONIS CORTEX—Lemon Peel

Family, Rutaceæ.

The fresh outer rind obtained from ripe lemons. Lemon Peel is used on account of its volatile oil, which possesses stimulating and aromatic properties, and is usually employed as a flavoring agent.

Official Preparations

Oleum Limonis (*Oil of Lemon*).—A pale yellow, volatile oil, having a fragrant odor, and an aromatic, somewhat bitter taste.

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

Official Derivative of Fresh Lemons

Limonis Succus (*Lemon Juice*).—The freshly expressed juice of ripe lemons. Used in making lemonade, an agreeable refrigerant drink for *acute febrile diseases,* and for preventing and treating *scurvy.* The juice depends for its value upon the *Citric Acid* contained in it.

LINUM—Linseed, Flaxseed

Family, Linaceæ.

The ripe seed of *Linum usitatissimum,* an annular herb with a stiff, solitary, round, smooth, green, erect stem, growing to the height of about 2 feet. Flax flowers in June or July, and fruits in August. The fruit is a globular capsule about the size of a pea, containing 10 seeds in distinct cells. The seeds, which are official, are about $\frac{1}{5}$ inch (5 mm.) long, ovate, flattened, pointed at one end, brown, glossy, covered with mucilaginous epithelium which swells in water. Its taste is mucilaginous and oily. Our supply is mostly from Russia. The seeds contain a large quantity of fixed oil, glutin, and albumin, and the integuments contain a considerable quantity of gum, which swells in water to make mucilage.

Action and Uses.—Whole flaxseed immersed in water furnishes a mucilaginous liquid, which is a demulcent used in cases of *acute inflammation of the gastro-intestinal tract.* Ground flaxseed, also known as *linseed meal,* is used in making poultices. The fixed oil expressed from flaxseed, known officially as *Oleum Lini,* is used in making Lime Liniment.

Official Preparations

Oleum Lini (*Linseed Oil*).—A fixed oil expressed from Flaxseed.

Linimentum Calcis (*Lime Liniment*). *Synonym*, Carron Oil.—Made by mixing together equal parts of Lime Water and Linseed Oil. *Used* in the treatment of *burns*.

LIQUOR FORMALDEHYDI—Solution of Formaldehyde

Synonym, Formalin.

Solution of formaldehyde is a clear, colorless, aqueous liquid, containing not less than 37 per cent., by weight, of absolute formaldehyde (HCOH), an oxidation product of methyl alcohol. It has a caustic taste, a pungent odor, and its vapor is highly irritating to mucous membranes; it should be neutral or only faintly acid. After long keeping it often becomes cloudy by reason of the separation of paraform aldehyde. If evaporated in a vacuum or over sulphuric acid, solution of formaldehyde rapidly forms a white, solid substance known as paraformaldehyde, which is insoluble in water, but which when heated to about 100° C. (212° F.) sublimes; at a higher temperature, 153° to 172° C. (307.4° to 341.6° F.), it melts and evolves gaseous formaldehyde. Solution of formaldehyde coagulates albumin and hardens gelatin, and unites with ammonia to form hexamethylenamine; reduces silver ammonium nitrate to metallic silver; forms a deep red color with a solution of sulphuric acid in which a little salicylic acid has been dissolved; forms a pink or rose-color zone in contact with a solution of resorcinol or phenol overlying sulphuric acid.

Gaseous formaldehyde may be generated by oxidizing the vapor of methyl alcohol by passing it over finely powdered platinum heated to incandescence. The action is purely catalytic. Numerous formaldehyde lamps are found in the market for generating the gas from methyl alcohol.

The solution is usually prepared by passing the vapor of methyl alcohol mixed with air over heated copper tubes, condensing the vapor in cooled copper tanks, and then adding water.

Action and Uses.—Solution of formaldehyde in contact with the unbroken skin produces some hardness and harshness, but unless repeatedly applied has little or no effect; upon mucous membranes or wounds, after the lapse of a few seconds, it gives rise to severe burning pain, at the same time coagulating and corroding the tissues. The vapor of formaldehyde is also highly irritating to mucous membranes, even in dilute form, giving rise to sneezing, coryza, and nasal, pharyngeal, laryngeal, and bronchial irritation, all of which may be severe if a concentrated vapor is inhaled.

The solution, if well diluted and taken internally in doses of a few drops, has little or no effect further than to possibly retard digestion; but if taken in concentrated form in larger quantities may give rise to severe pain in the mouth, pharynx, œsophagus, and stomach, and all the symptoms of severe gastritis. The vapor, if inhaled in concentrated form, may give rise to rhinitis, pharyngitis, laryngitis, and bronchitis.

Poisoning by formaldehyde should be treated by the administration of well-diluted solutions of water of ammonia or aromatic spirit of ammonia, followed by olive oil.

The value of formaldehyde lies in its antiseptic, disinfectant, deodorizing, preservative, and cauterizing properties.

As an antiseptic, dilute solutions may be employed for disinfecting the hands of the surgeon and also surgical instruments. Its disadvantages as an antiseptic are that the skin of the hands will become harsh from the frequent use of this substance; and surgical instruments and dressings may be more thoroughly disinfected by heat.

The chief value of solution of formaldehyde lies in *germicidal properties* when used as a spray or in the gaseous form for *disinfecting sick rooms.* It does not injure the carpets, bedding, books, furniture, nor other ordinary household furnishing, while at the same time its penetrating power is very great. For disinfecting rooms the solution may be applied by spraying the room, tightly closing, and permitting it to remain closed for twenty-four hours. After which it should be well aired. When gaseous formaldehyde is employed for disinfecting rooms the latter should be tightly sealed and the gas passed into it through a key-hole. Of course, rooms being disinfected by formaldehyde cannot be inhabited during the process of disinfection. After disinfecting with formaldehyde the irritating vapor may, if desired, be abolished by vaporizing ammonia in the room. For cesspools, privies, and dejecta from the sick room, it may be used in concentrated form, but is probably less valuable than the chlorine compounds.

As a deodorizer, solution of formaldehyde in dilute solution may be used as a wash for *foul ulcers* and *malignant growths;* its disadvantage lies in its irritating propensities.

As a preservative, the addition of solution of formaldehyde to milk and other articles of diet may be effective, but it probably interferes with the digestive processes and the practice should be condemned. As a preservative for anatomical specimens it is valuable; it not only preserves but hardens the specimen; under some circumstances hardening may be objectionable. It is the chief ingredient of embalming fluids.

As a cauterizing agent for destroying *venereal ulcers* or other *ulcers,* it is effective, but so extremely painful as to probihit its use in most cases.

LITHIUM SALTS

Lithium belongs to the alkali metals. It is found in chemical combination with minerals, in the water of mineral springs, and in the ash of some plants. Several salts are official, two of which are used on account of lithium contained in them (*carbonate and citrate*), and others on account of the acid radical or element with which they are combined (*benzoate, salicylate, and bromide*). The carbonate, citrate, and effervescent citrate are uric acid solvents, and are used in the treatment of *gout* and *rheumatism*. The benzoate is used for the same purposes and as a carrier of benzoic acid, the bromide as a nervous sedative, while the salicylate is used for the same purposes as all other alkaline salicylates. All of the official salts of lithium are decomposed by mineral acids; the soluble salts are precipitated from solution by soluble carbonates and phosphates. With the exception of lithium carbonate, all the official salts are soluble both in water and alcohol.

Official Salts of Lithium

Lithii Benzoas (*Lithium Benzoate*). *Formula*, $LiC_7H_5O_2 = 127.11$.—A light, white powder, or small, shining, crystalline scales, odorless or of a faint benzoin-like odor, and a cooling, sweet taste; permanent in air. It is *soluble* in 3 parts of water, and 13 parts of alcohol. Aqueous solutions have an alkaline reaction to litmus paper.

Dose.—0.3 to 2 Gm.; 5 to 30 grains. (See also *Acidum Benzoicum.*)

Lithii Bromidum (*Lithium Bromide*). *Formula*, LiBr = 86.34.—A white, granular, deliquescent salt, having a sharp, slightly bitter taste. It is *soluble* in 0.6 part of water, freely soluble in alcohol.

Dose.—0.6 to 4 Gm.; 10 to 60 grains. (See also Bromides.)

Lithii Carbonas (*Lithium Carbonate*). $Li_2CO_3 = 73.51$.—A light, white powder, permanent in air, and having an alkaline taste. It is *soluble* in 75 parts of water, more soluble in water saturated with carbon dioxide, less soluble in boiling water than in cold, and insoluble in alcohol.

Dose.—0.12 to 0.6 Gm.; 2 to 10 grains.

Lithii Citras (*Lithium Citrate*). *Formula*, $Li_3C_6H_5O_7 + 4H_2O = 280.08$.—A white powder, or colorless crystals; deliquescent on exposure to moist air, and having a cooling, faintly alkaline taste. It is *soluble* in 2 parts of water; almost insoluble in alcohol.

Dose.—0.3 to 1.2 Gm.; 5 to 20 grains.

Lithii Citras Effervescens (*Effervescent Lithium Citrate*).—A white, granular preparation, deliquescent upon exposure to moist atmosphere; soluble in water with effervescence. It contains 5 per cent. of Lithium Citrate intimately mixed with Tartaric Acid, Citric Acid, and Sodium Bicarbonate.

Dose.—4 to 15 Gm.; 1 to 4 ℥.

Lithii Salicylas (*Lithium Salicylate*). *Formula,* $LiC_7H_5O_3 = 142.99$.—A white, or grayish-white powder, having a sweetish taste; deliquescent in moist atmosphere, and very soluble in water and alcohol. An aqueous solution of the salt is slightly acid to blue litmus paper.

Dose.—0.6 to 2 Gm.; 10 to 30 grains. (See also *Acidum Salicylicum.*)

LOBELIA—Lobelia

Family, Campanulaceæ.

Lobelia is the dried leaves and tops of *Lobelia inflata,* collected after a portion of the capsules have become inflated. The lobelia plant is an annular herb, with an erect, coarsely angled stem 1 to 2 feet high; the leaves are alternate, ovate or oblong, with irregularly serrated-denticulate margins. The plant blooms in July, the flowers being small, pale blue, and arranged in racemes. The fruit is a two-cell inflated capsule, containing numerous brownish reticulated seeds. Lobelia has a slight but irritating odor, its taste is strongly acrid. It contains a liquid alkaloid *lobeline, lobelic acid,* a pungent volatile oil, and a small percentage of gum and resin. The plant is a native of the United States and Canada.

Action and Uses.—Locally, lobelia is an irritant; internally, it is an emetic, antispasmodic, expectorant, and a respiratory and circulatory depressant. In overdoses, it produces great prostration, coma, and convulsions. In medicinal doses, it is used as an *emetic,* as an antispasmodic in *bronchial asthma,* and to allay cough and promote expectoration in *acute bronchitis.*

Official Preparations

Fluidextractum Lobeliæ (*Fluidextract Lobelia*).—Made with a menstruum of Water, 7.25 parts, and Acetic Acid, 2.75 parts.

Dose.—As an expectorant or depressant, 0.06 to 0.3 Cc., 1 to 5 minims; as an emetic, 1 to 4 Cc.; 15 to 60 minims.

Tinctura Lobeliæ (*Tincture of Lobelia*).—Made by exhausting 10 Gm. of Powdered Lobelia, by percolating with Diluted Alcohol to make 100 Cc.

Dose.—As an expectorant or depressant, 0.3 to 2 Cc., 5 to 30 minims; as an emetic, up to 8 Cc., 2 f℥.

LUPULINUM—Lupulin

See *Humulus.*

LYCOPODIUM—Lycopodium

Family, Lycopodiaceæ.

A fine, pale yellowish, very mobile powder, without taste or odor, consisting of the spores of *Lycopodium clavatum* (Club Moss) or other

species of *Lycopodium*. The plant from which the spores are obtained is a low creeping, perennial plant, native to Europe, Asia, and North America, growing in dry woods. The powder floats upon water, not being wetted by it, is highly inflammable, yielding not more than 5 per cent. of ash, and contains a large quantity of fixed oil.

Use.—Lycopodium is used exclusively as a *dusting powder* for inflamed and raw surfaces, and also by pharmacists to prevent adhesion of pills, powders, troches, etc.

MAGNESIUM SALTS AND PREPARATIONS

Magnesium is a silver-white metal, which, when heated to redness, burns with a bright light, and is reduced to magnesium oxide. It is widely distributed in nature as chloride, sulphate, carbonate, and silicate. The principal sources from which the salts of magnesium are derived are *dolomite*, the double magnesium and calcium carbonate, and from a native *silicious magnesium hydroxide*, which is mined in the vicinity of Baltimore, Maryland, and also in the southern counties of Pennsylvania. The soluble salts of magnesium in concentrated aqueous solutions are precipitated by the fixed alkali hydrates, calcium hydrate, potassium and sodium carbonate, or the alkaline phosphates and arsenates, and by soluble sulphates, oxalates, and tartrates.

Official Magnesium Salts and Compounds

Magnesii Carbonas (*Magnesium Carbonate*). *Formula*, $(MgCO_3)_4 \cdot Mg(OH)_2 + 5H_2O = 482.26$.—Magnesium carbonate is in light, white, friable masses, or a bulky, white powder, almost entirely *insoluble* in water, but imparting to it a slightly alkaline reaction; insoluble in alcohol. It is decomposed with effervescence by acids. When strongly heated it is converted into magnesium oxide.

Magnesium carbonate is obtained by double decomposition between magnesium sulphate and sodium carbonate in the presence of water. If heavy magnesium carbonate is desired, concentrated solutions of the two salts are mixed. If light magnesium carbonate is desired, diluted solutions are mixed.

Action and Uses.—Magnesium carbonate is an antacid, and in full doses a purgative. It is *used* to overcome *gastric hyperacidity*, as a *laxative*, and locally as a dusting powder to prevent *chafing*. It is used in the manufacture of Magnesium Oxide, and also in preparing Solution of Magnesium Citrate.

Dose.—0.6 to 1 Gm.; 10 to 15 grains.

Magnesii Oxidum (*Magnesium Oxide, Magnesia*). *Synonyms*, Calcined Magnesia, Light Magnesia, Husband's Magnesia. *Formula*, $MgO = 40.06$.—Magnesium oxide is a fine, white, bulky powder. On exposure to air, it slowly absorbs moisture and carbon dioxide.

It is almost *insoluble* in water; insoluble in alcohol, but dissolves in diluted acids. When mixed with water and allowed to settle, it becomes hydrated, and forms a gelatinous mass.

Magnesium is made by exposing light magnesium carbonate to a red heat.

Action and Uses.—Magnesia is used as a *purgative* and *antacid*. It is insoluble in water, but may be *administered* by adding it to water and milk, thoroughly stirring, and drinking before it settles. In full doses, it produces watery stools unaccompanied by griping. When added to milk of artificially fed infants, it alkalinizes the milk, and also acts as a laxative.

Dose.—2 to 4 Gm.; 30 to 60 grains.

Magnesii Oxidum Ponderosum (*Heavy Magnesium Oxide*). *Synonym*, Magnesia Ponderosa. *Formula*, MgO = 40.06.—A fine, white, dense powder. Differing from Light Magnesia only in that it is more bulky, and does not readily unite with water to form a gelatinous hydroxide.

Action and Uses.—Similar to those of Magnesia.

Dose.—2 to 4 Gm.; 30 to 60 grains.

Magnesii Sulphas (*Magnesium Sulphate*). *Synonym*, Epsom Salt. *Formula*, $MgSO_4 + 7H_2O = 244.69$.—Magnesium sulphate occurs in small, colorless, prismatic needles, or rhombic prisms; slowly efflorescent in air; *soluble* in 1.1 parts of water; insoluble in alcohol; cooling, saline, and bitter taste; neutral reaction. The salt was originally obtained by evaporating the water of Epsom Spring, of England, but in this country it is usually obtained by treating native silicious magnesium hydroxide with sulphuric acid. The salt is present in many natural waters, and gives to them their purgative properties.

Action and Uses.—When given internally or by enema, it is *purgative*, producing large watery evacuations. With the exception of castor oil, it is the least irritating of all purges. It is one of the ingredients of Compound Infusion of Senna.

Dose.—8 to 30 Gm.; 2 to 8ʒ.

Magnesii Sulphas Effervescens (*Effervescent Magnesium Sulphate*).—A white, granular salt, freely effervescent when added to water. Prepared by powdering and thoroughly mixing 500 Gm. of Magnesium Sulphate, 403 Gm. of Sodium Bicarbonate, 211 Gm. of Tartaric Acid, 136 Gm. of Citric Acid, heating the whole until it is a uniform mixture, granulating, and drying.

Uses.—This salt furnishes a convenient and agreeable method of administering magnesium sulphate in an efflorescent draught.

Dose.—16 to 60 Gm.; ½ to 2ʒ.

Liquor Magnesii Citratis (*Solution of Magnesium Citrate*).—Made by dissolving 15 Gm. of Magnesium Carbonate in an aqueous solution of Citric Acid, filtering, and placing in a strong bottle of the capacity of about 360 Cc., containing 60 Cc. of Syrup of Citric Acid, and adding enough Water to nearly fill the bottle, lastly adding 2.5 Gm. of Potas-

sium Bicarbonate and immediately stoppering the bottle so that the carbon dioxide generated will not escape.

This popular agreeable effervescent solution is used as a purgative. It may be administered at one dose or in doses of about 4 ℥, until the whole quantity has been taken.

Dose—360 Cc.; 12 f℥.

MALTUM—Malt

Family, Gramineæ.

The grain of *barley* partially germinated artificially and then dried. It is made by soaking barley in water, heaping in piles until it has partially germinated, and then subjecting it to heat. By this process is developed diastase and peptose, two enzymes or ferments useful for assisting feeble digestion, which convert a part of the starch into sugar and the albumins into peptone. It is used in the manufacture of Extract of Malt.

Official Preparation

Extractum Malti (*Extract of Malt*).—An extract of about the consistency of honey; made by macerating malt with water at a carefully regulated temperature, straining, and concentrating the resultant filtrate in a water-bath or vacuum-apparatus at a temperature not exceeding 55° C. (131° F.).

Action and Uses.—Extract of Malt is used as a nutrient, a tonic, and to assist digestion.

Dose.—15 to 30 Cc.; ½ to 1 f℥.

MANGANESE COMPOUNDS

Manganese is a very hard, brittle metal, which in powdered form decomposes readily. The element is reddish-gray, found in nature in considerable quantities as *manganese oxide* (MnO_2), *manganese sesquioxide* (Mn_2O_3), and as *manganese carbonate* ($MnCO_3$). The precipitated dioxide, sulphate, and hypophosphite, and also potassium permanganate, a salt of manganic acid, are official.

The soluble salts of manganese are precipitated from solution by alkali hydroxides, carbonates, hypophosphites. Potassium permanganate is a powerful oxidizer, and is incompatible with almost all organic substances, oxidizing them, and forming explosive compounds when triturated dry with sugar, tannic acid, sulphur, hypophosphites, oils, gums, and other readily oxidizable substances.

Official Compounds

Mangani Dioxidum Præcipitatum (*Precipitated Manganese Dioxide*). *Synonym,* Black Oxide of Manganese.—Precipitated manganese dioxide

is a heavy, fine, black powder, without odor or taste; permanent in air; *insoluble* in water and alcohol; made by precipitating an aqueous solution of manganese sulphate by an ammoniated solution of hydrogen dioxide. The official preparation consists chiefly of manganese dioxide (not less than 80 per cent.), along with small amounts of other oxides of manganese.

Action and Uses.—Precipitated manganese dioxide is a tonic and alterative, and is administered internally in *anemia,* and in functional *amenorrhœa* when due to anemia. It is best *prescribed* in pills or capsules.

Dose.—0.06 to 0.3 Gm.; 1 to 5 grains.

Mangani Hypophosphis (*Manganese Hypophosphite*). *Formula,* $Mn(PH_2O_2)_2 + H_2O = 201.54$.—Manganese hypophosphite is a pink, crystalline powder, without odor and almost tasteless; permanent in air; *soluble* in 6.6 parts of water, and almost insoluble in alcohol. In aqueous solutions it is neutral to litmus paper. The salt is made by double decomposition between manganese sulphate and calcium hypophosphite.

Action and Uses.—Manganese hypophosphite is a tonic and alterative, and is administered internally in *anemia*, particularly when associated with *neurasthenia*, *scrofula*, and *incipient tuberculosis.* It enters into the composition of Compound Syrup of Hypophosphites.

Dose.—0.06 to 0.3 Gm.; 1 to 5 grains.

Mangani Sulphas (*Manganese Sulphate*). *Formula,* $MnSO_4 + 4H_2O = 221.47$.—Manganese sulphate appears in colorless, or pale rose-colored, translucent, tetragonal prisms, having a slightly bitter and astringent taste, slightly efflorescent in air, *soluble* in 0.7 part of water, and insoluble in alcohol. In aqueous solution it is slightly acid to litmus paper. It is made by treating manganese with sulphuric acid.

Action and Uses.—Manganese Sulphate is a tonic and alterative, and is used to a limited extent in the treatment of *anemia* and *malarial jaundice.*

Dose.—0.06 to 0.3 Gm.; 1 to 5 grains.

Potassii Permanganas (*Potassium Permanganate*). *Formula,* $KMnO_4 = 156.98$.—Potassium permanganate is seen in slender, monoclinic prisms, of a dark purple color, almost opaque by transmitted light, and of a blue, metallic luster by reflected light. It is permanent in air; *soluble* in about 15 parts of water, is decomposed by alcohol, and, when in concentrated solution or in dry state, should not be brought in contact with organic or other readily oxidizable substances. It is a powerful oxidizer, and if triturated with oxidizable substances forms an explosive. In solution, it is readily decomposed by all organic substances, oxidizing them and being reduced to manganese dioxide. It is manufactured by heating together manganese dioxide, potassium hydroxide, and potassium chlorate, treating the fused mass with boiling water, and passing through the fluid thus obtained a stream of carbon dioxide.

Action and Uses.—Potassium permanganate is a powerful oxidizing agent, and when brought in contact with organic matter is decomposed with the liberation of oxygen, which, in its nascent state, acts as an antiseptic and deodorant. Dissolved in distilled water, it is used as a deodorant and disinfectant for cleansing *ulcers, sloughing wounds, ulcerating cancers, abscess cavities,* as a mouth wash in *stomatitis,* as a spray in *ozena* and in *diphtheria,* as an irrigating fluid in *otorrhœa,* as a *disinfectant* for the dejecta from the sick rooms, and as a disinfectant for the skin and hands of surgeons prior to the performance of surgical operations. The brown stain produced upon the skin and fabrics by it may be instantly removed by the use of a solution of hydrogen dioxide, or by a solution of oxalic acid. The strength of solutions used for the above purposes may vary from 1 to 5000 to 1 in 500. Hypodermic injections, into and about the site of the wound, have been used in the treatment of *snake bites.* Administered internally, or used by lavage, it is a chemical *antidote to phosphorus and opium.* It is administered by mouth in functional *amenorrhœa.* The salt may be *dispensed* in pills, capsules, compressed tablets, or in aqueous solution.

Solutions of the salt should be made in distilled water; pills of it may be made with hard petrolatum, resin cerate, kaolin, or soft paraffin as an excipient. When taken internally, potassium permanganate should be followed by a full glass of water to prevent irritation of the mucous membrane of the stomach.

Incompatibilities.—Potassium permanganate is incompatible with all organic substances.

Dose.—0.03 to 0.2 Gm.; ½ to 3 grains.

MANNA—Manna

Family, Oleaceæ.

Manna is the concrete saccharine exudation of *Fraxinus Ornus,* a small tree growing naturally and cultivated in Sicily. The juice is obtained by cutting through the bark of the wood, and when the manna, which exudes as a clear liquid, becomes inspissated, it is then collected. It is seen in irregular masses; externally, yellowish-white; internally, white, porous, and crystalline. Its taste is distinctly sweet, slightly bitter, and faintly acid.

The concrete juice contains *mannite,* glucose, mucilage, and *fraxin.*

Action and Uses.—Manna is used as a laxative, a demulcent, and as a nutrient. It is used in *chronic constipation,* usually in combination with more active laxatives, its sweet taste being agreeable to most persons.

In combination with senna, magnesium sulphate, and fennel, it enters into the composition of Compound Infusion of Senna.

Dose.—4 to 30 Gm.; 1 to 8 ʒ.

MARRUBIUM—Marrubium

Synonym, Horehound. *Family,* Labiatæ.

Marrubium is the dried leaves and flowering tops of *Marrubium vulgare,* a perennial herb growing in Europe, Asia, and North America.

The stem of the plant is quadrangular, covered with a cottony felt; the leaves are about 1 inch (2.5 cm.) long, opposite, petiolate, roundish ovate, obtuse; margin crenate, downy above, white-hairy beneath; the flowers are woolly whorls, with stiff ten-toothed calyx, whitish, bilabiate corolla. The fruit consists of four ovoid, obtuse, nearly smooth nutlets, about $\frac{1}{15}$ inch (1.5 mm.) long. The drug has a rather agreeable odor, and somewhat aromatic and bitter taste.

It contains a volatile oil, a glucoside, *Marrubiin,* resin, and tannin.

Action and Uses.—Marrubium is a stomachic, anthelmintic, and expectorant. It is popular as a household remedy, and is used in the treatment of *dyspepsia* and *coughs,* and for the removal of *round worms.*

The drug is best *dispensed* in infusion. There are no official preparations made.

Dose.—2 to 4 Gm.; ½ to 1 ℥, in infusion.

MASTICHE—Mastic

Family, Anacardiaceæ.

Mastic is a concrete resinous exudate from *Pistacia Lentiscus,* a shrub or small tree native to the Mediterranean basin, and islands. It is obtained by making incisions in the stem and branches of the plant during June and July, and when the exudate becomes dry, collecting it. The best mastic comes into the market in pale-yellow or greenish-yellow, transparent tears, having a glass-like luster; the tears are brittle, but become plastic when chewed. The substance has a mild, balsamic odor, and a mild terebinthinate taste.

It is *insoluble* in water; completely *soluble* in alcohol, and almost completely soluble in ether.

Mastic contains a large quantity of resin, a volatile oil, and a bitter principle.

Action and Uses.—Mastic is a mild stimulant, diuretic, and expectorant. Dissolved in alcohol or ether it may be applied locally as a protective to *slight abrasions* and *fissures.* It enters into the official Pills of Aloes and Mastic, each containing 0.13 Gm. (2 grains) purified aloes, 0.04 Gm. ($\frac{2}{3}$ grain) mastic, and 0.03 Gm. ($\frac{1}{2}$ grain) of red rose. Mastic dissolved in the oil of turpentine is used as a varnish.

Dose.—0.06 to 0.6 Gm.; 1 to 10 grains.

MATICO—Matico

Family, Piperaceæ.

The leaves of *Piper angustifolium,* a shrub growing in Mexico and Cuba.

The leaves are about 4 to 6 inches (10 to 15 cm.) long. short-petiolate, oblong-lanceolate, apex pointed, base unequally heart-shaped, margin finely crenulate, tessellated above, reticulate beneath, the meshes small, and the veins densely brownish-hairy; taste spicy, bitterish, and astringent.

The drug contains a volatile oil, *artanthic acid,* a pungent resin, a bitter principle, tannin, and mucilage.

Action and Uses.—The leaves are sometimes applied to control *small hemorrhages,* clotting being promoted by their hairy structure. Matico owes its properties, mostly, to a volatile oil, which is a mild stimulant, diuretic, and hemostatic. The drug is now but little used in the treatment of *bronchitis, amenorrhœa, hemorrhoids, diarrhœa, dysentery,* and *incontinence of urine.*

Dose.—2 to 4 Gm.; ½ to 1 ʒ, in decoction.

Official Preparation

Fluidextractum Matico (*Fluidextract of Matico*).—Made with a menstruum of 3 parts of Alcohol, and 1 part of Water.

Dose.—2 to 4 Cc.; ½ to 1 f ʒ.

MATRICARIA—Matricaria

Synonym, German Chamomile. *Family,* Compositæ.

The dried flower-heads of *Matricaria Chamomilla,* an annual herb growing in Europe, western Asia, and cultivated in German settlements in the United States. The plant blooms from May to August. The flower heads are ¼ to ⅓ inch (6 to 8 mm.) broad, with a flattish imbricated involucre, a conical, hollow, and naked receptacle, 10 to 20 white, ligulate ray-florets, and numerous tubular disk-florets; odor aromatic; taste, strongly aromatic and bitter.

The flower contains a volatile oil, *artanthic acid,* tannin, and extractive matter.

Uses.—Matricaria is a popular domestic medicine, used as a *diuretic, diaphoretic, antispasmodic, anthelmintic,* and *tonic.* It is usually *administered* in an infusion.

Dose.—15 to 30 Gm.; ½ to 1 ℥, in infusion.

MEL—Honey

Honey separated from the honey-comb, when fresh, is a light yellowish or yellowish-brown, transparent, syrupy liquid, but upon keeping

gradually becomes opaque and crystalline. It consists of a mixture of dextrose and levulose in water.

Uses.—Honey is used as a mild laxative, a food, as an excipient, and for making a class of preparations known as Honeys or *Mellita.*

Official Preparations

Mel Depuratum (*Clarified Honey*).—Prepared by mixing honey with moistened paper pulp, heating over a water-bath, removing the scum which rises to the top, adding enough distilled water to make up the loss incurred by evaporation, straining, and mixing the strained liquid with 5 per cent. of its weight of glycerin.

Mel Rosæ (*Honey of Rose*).—Made by adding to 12 Cc. of the Fluidextract of Rose enough Clarified Honey to make 100 Gm.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

MENTHA PIPERITA—Peppermint

Family, Labiatæ.

Peppermint is the dried leaves and flowering tops of *Mentha piperita*, an ordinarily perennial herb, growing wild in Asia, Europe, and North America in low, moist soil.

The branches are quadrangular, often purplish, with a few scattered hairs; the leaves are dark green, ovate-lanceolate, 1½ to 4 inches (3 to 8 cm.) long, and sharply serrated margins; the flower whorls are purplish, tubular, in oblong or ovoidal spiles. The drug has a strong, characteristic odor, and a cooling, pungent taste, and depends for its medicinal properties upon a volatile oil which contains *Menthol.*

Action and Uses.—Peppermint is a carminative, stimulant, and antispasmodic. It is used to relieve *flatulency*, *nausea*, and *colicky pains.* Its official preparations are used as flavoring agents and agreeable vehicles.

Derivative and Official Preparations

Oleum Menthæ Piperitæ (*Oil of Peppermint*).—A colorless, volatile oil, obtained by distillation from the fresh or partly dried leaves and flowering tops of peppermint, and rectified by steam distillation. It should yield not less than 6 per cent. of ester, calculated as Menthyl Acetate, and not less than 50 per cent. of total Menthol. It is sparingly soluble in water, freely *soluble* in alcohol.

Action and Uses.—Oil of Peppermint is a carminative, stimulant, diuretic, and a mild local anesthetic. It is used for relieving *flatulency*, *nausea*, *intestinal pain*, and locally in the treatment of *rheumatism* and *neuralgia.* In overdoses, it produces inflammation of the stomach, bowels, kidneys, and bladder.

It enters into the composition of Peppermint Water, Spirit of Peppermint, Cataplasm of Kaolin, Antiseptic Solution, Vegetable Cathartic Pills, and Compound Pills of Rhubarb.

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

Aqua Menthæ Piperitæ (*Peppermint Water*).—A weak (0.2 per cent.) solution of the Oil of Peppermint in Distilled Water.

Dose.—4 to 30 Gm.; 1 to 8 f℥.

Spiritus Menthæ Piperitæ (*Spirit of Peppermint*). *Synonym,* Essence of Peppermint.—Prepared by adding 1 Gm. of Peppermint to a solution containing 10 Cc. of Oil of Peppermint dissolved in enough Alcohol to make 100 Cc., macerating for twenty-four hours, filtering, and adding enough Alcohol through the filter to make the product measure 100 Cc.

Dose.—0.6 to 2 Cc.; 2 to 30 minims.

MENTHA VIRIDIS—Spearmint

Family, Labiatæ.

The dried leaves and flowering tops of *Mentha spicata,* a perennial herb, native to Europe and Asia, and cultivated in the United States. The drug closely resembles peppermint in appearance, but the leaves are usually sessile and lanceolate, and the flower spikes slenderer. The odor and taste resemble peppermint, but is distinguishable from that drug; it is usually thought to be more agreeable. Spearmint owes its medicinal virtue to a volatile oil, which contains terpene.

Action and Uses.—The action and uses of this drug are the same as Peppermint.

Derivative and Official Preparations

Oleum Menthæ Viridis (*Oil of Spearmint*).—A colorless, yellow, or greenish-yellow liquid, having the characteristic, strong odor of spearmint, and a hot aromatic taste. It is obtained by distillation from the fresh, or partly dried, leaves and flowering tops of Spearmint, and rectified by steam distillation.

It is *soluble* in alcohol, ether, chloroform, and fixed and volatile oils.

Action and Uses.—Its action and general uses are the same as those of Oil of Peppermint.

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

Aqua Menthæ Viridis (*Spearmint Water*).—A weak (0.2 per cent.) solution of the oil of spearmint in distilled water.

Dose.—4 to 30 Cc.; 1 to 8 f℥.

Spiritus Menthæ Viridis (*Spirit of Spearmint*). *Synonym,* Essence of Spearmint.—Prepared by adding 1 Gm. of Spearmint to a solution

containing 10 Cc. of Oil of Spearmint dissolved in enough Alcohol to make 100 Cc., macerating for twenty-four hours, filtering, and adding enough Alcohol through the filter to make the product measure 100 Cc.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

MENTHOL—Menthol

Formula, $C_{10}H_{19}OH = 154.98$.

Colorless, needle-shaped or prismatic crystals, having the strong odor and taste of peppermint, obtained from the Oil of Peppermint.

It is only *slightly soluble* in water, but imparts to it its odor and taste; is *freely soluble* in alcohol, ether, and chloroform, and is also soluble in volatile and fixed oils. When triturated dry with camphor, phenol, hydrated chloral, naphthol, resorcinol, thymol, or ethyl carbamate, it forms a soft mass or liquid. Chemically, it is a secondary alcohol.

Action and Uses.—Menthol is a local anesthetic, antispasmodic, and stimulant. It is used locally to relieve *headache, neuralgia, rheumatism, coryza,* and *irritative cough*, and administered internally in treating diarrhœa, and for causing the expulsion of hookworms.

Dose.—0.03 to 0.06 Gm.; $\frac{1}{2}$ to 1 grain.

METHYLIS SALICYLAS—Methyl Salicylate

See *Acidum Salicylicum*.

METHYLTHIONINÆ HYDROCHLORIDUM—Methylthionine Hydrochloride

Synonym, Methylene Blue. *Formula*, $C_{16}H_{18}N_3SCl = 317.36$.—Methylthionine hydrochloride is seen as a dark green, crystalline powder, or in fine, prismatic crystals, having a bronze-like luster. It is *soluble* in alcohol and water, the solution having a deep blue color. It is obtained by the action of hydrogen sulphide upon an oxidation product of paramido-dimethylaniline. Unfortunately, the zinc chloride of tetramethylthionine is also known as methylene blue; it is not used as a medicine, but exclusively as a dye.

Methylene blue must not be confounded with Methyl Blue, which is sodium triphenyl-pararosaniline-sulphonate, used as an antiseptic.

Action and Uses.—When taken internally in medicinal doses, methylene blue appears to be without any notable effect upon the tissues, organs, or centres, and, after absorption, is chiefly eliminated by the kidneys and bowels, imparting to the urine and feces a distinctly blue color; if taken in full medicinal doses, it imparts its characteristic color to

the tissues. The drug is looked upon as an antiseptic, and is used in the treatment of *pyelitis*, *cystitis*, *gonorrhœa*, and *malaria*.

It is best *administered* in capsules.

Incompatibilities.—It is precipitated from solution by potassium iodide and potassium hydroxide.

Dose.—0.06 to 0.3 Gm.; 1 to 5 grains.

MEZEREUM—Mezereum

Family, Thymeleaceæ.

The dried bark of *Daphne Mezereum*, a small shrub native to Europe, and of other European species of *Daphne*, growing in mountainous regions. It comes into the market in bundles of thin, flexible, tough bands, the edges fringed with partly detached bast fibers; the outer surface is yellowish or yellowish-brown and wrinkled; the inner surface is green or whitish, has a satiny luster, and is finely striated. The drug has only a slight odor, but a very acrid taste.

The bark contains an *acrid resin*, to which it owes its vesicating properties, and in addition, it contains several unimportant glucosides. It yields its virtues to alcohol, and to boiling water.

Action and Uses.—Mezereum is an irritant and vesicant. It is used *locally* as a *counterirritant* in *chronic rheumatism*, and *synovitis*, and as a stimulant to *indolent ulcers*. Internally, it is used to a limited extent in the treatment of *scrofula*, and *chronic rheumatism*. In *overdoses*, the drug gives rise to violent gastro-enteritis.

It enters into the composition of Compound Syrup of Sarsaparilla.

Dose.—0.3 to 0.6 Gm.; 5 to 10 grains, in decoction.

Official Preparation

Fluidextractum Mezerei (*Fluidextract of Mezereum*).—Made with a menstruum of alcohol, 4 parts, and water, 1 part.

Used locally as a counterirritant, but may be given internally.

Dose.—0.3 to 0.6 Cc.; 5 to 10 minims.

MORPHINA—Morphine

See *Opium*.

MOSCHUS—Musk

Musk is the dried secretion from the preputial follicles of the musk deer, *Moschus moschiferus*.

Musk is usually seen in irregular, dark reddish-brown, unctuous grains, having a peculiar penetrating and persistent odor, and a bitterish

taste. About 10 to 20 per cent. of musk is *soluble* in alcohol, and from 50 to 75 per cent. is soluble in water.

Musk is procured from wild animals, from India to Siberia, much resembling our own deer in shape and size, without horns, but a tusk on each side. The substance, in a fluid state, is contained in a projecting hairy sac between the umbilicus and prepuce. Anteriorly, this follicle has a small hairy orifice, and posteriorly a furrow corresponding with the opening of the prepuce. After the animal is killed the sac is at once cut off, dried by artificial heat, and sent into the market. The yield from a single animal is about 2 drams.

Action and Uses.—Musk is a stimulant and an antispasmodic, and is used in the treatment of profound *exhaustion* and *depression*, such as is often seen in the later stages of *typhoid fever*, and in the *pneumonia of drunkards;* for the relief of *hiccough*, and in *neurasthenia*.

Dose.—0.3 to 0.6 Gm.; 5 to 10 grains.

Tinctura Moschi (*Tincture of Musk*).—Prepared by macerating 5 Gm. of Musk with 90 Cc. of Diluted Alcohol, filtering, and passing enough Diluted Alcohol through the filter to make 100 Cc. of tincture.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

MYRISTICA—Myristica

Synonym, Nutmeg. *Family*, Myristicaceæ.

Myristica is the kernel of the ripe seed of *Myristica fragrans*, an evergreen tree, 25 to 50 feet (7.5 to 15 M.) high, a native of Molucca Island, and cultivated in tropical countries.

Myristica is ovoidal or ellipsoidal, about 1 inch (25 mm.) long, and ¾ inch (18 mm.) thick; externally, light-brown, with a reticulate furrow, with circular scars at the broad end; internally, more or less mottled; odor strong and aromatic; taste aromatic, warm and slightly bitter.

Myristica contains volatile oil, fixed oil, starch, and proteids.

Action and Uses.—Myristica is a stimulant, stomachic, nervous sedative, and an aromatic. It is used in the treatment of *serous diarrhœa*, *flatulency*, *vomiting*, and for its mild sedative effect in prescriptions containing more active nerve sedatives. In *overdoses*, Myristica sometimes produces symptoms of cerebral excitement, similar to those produced by overdoses of Cannabis Indica. It enters into the composition of Aromatic Powder, and the Compound Tincture of Lavender.

Dose.—0.3 to 1.2 Gm.; 5 to 20 grains.

Official Derivative

Oleum Myristicæ (*Oil of Myristica*). *Synonym*, Oil of Nutmeg.—A thin, colorless, pale-yellow, volatile oil, having the characteristic odor of nutmeg, and a warm, spicy taste, obtained by distillation from Nutmeg.

It enters into the formula of Aromatic Spirit of Ammonia.

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

MYRRHA—Myrrh

Family, Burseraceæ.

A gum-resin obtained from *Commiphora Myrrha,* a low, stunted bush, or small tree, which grows along the Red Sea coast. The gum exudes spontaneously as a juice throught the stem-bark, and is collected after hardening.

It is in roundish or irregular tears, or masses, without luster; its color brownish-yellow or reddish-brown; readily pulverizable when cold and dry, but difficultly so when warm and damp. Its odor is balsamic and its taste aromatic, bitter, and mildly acrid, producing some hardening and slight wrinkling of the mucous membrane of the mouth.

It is *insoluble* in water, but when triturated with it, yields a brownish-yellow emulsion; it is partially *soluble* in alcohol, yielding with it a brownish-yellow tincture, which acquires a purplish tint with the addition of nitric acid.

Myrrh contains from 4 to 8 per cent. of volatile oil; from 25 to 40 per cent. of resin; from 40 to 60 per cent. of gum; and a bitter principle.

Action and Uses.—In moderate doses, myrrh is a mild circulatory stimulant, an expectorant, and increases the activity of the uterine mucous membrane. *Locally,* it produces a constringing and hardening effect upon mucous membranes. The drug is used *internally,* as an expectorant in the later stages of *bronchitis,* for *endometritis,* and *amenorrhœa.* The tincture, diluted with water, is employed as a mouth wash in the treatment of *spongy, bleeding gums,* and in *aphthous stomatitis.*

Myrrh enters into the composition of Compound Iron Mixture, Pills of Aloes and Myrrh, Compound Pills of Rhubarb, and Tincture of Aloes and Myrrh. Liquid alcoholic preparations containing myrrh are precipitated by water.

Dose.—0.06 to 0.3 Gm.; 1 to 5 grains.

Official Preparation

Tinctura Myrrhæ (*Tincture of Myrrh*).—Prepared by macerating 20 Gm. of Myrrh with Alcohol, filtering, and adding enough alcohol through the filter to make 100 Cc. of tincture.

Dose.—0.3 to 1 Cc.; 5 to 15 minims.

NAPHTHALENUM—Naphthalene

Formula, $C_{10}H_8 = 127.10$.

Naphthalene is a hydrocarbon, sometimes known as "coal-tar camphor;" it is obtained from coal-tar and purified by crystallization. It forms colorless, shining, transparent scales, having a characteristic odor, and a burning, aromatic taste. When exposed to light and air it acquires a light brownish color, and slowly volatilizes.

It is insoluble in water, *soluble* in 13 parts of alcohol, and more soluble in ether, chloroform, and fixed and volatile oils.

Action and Uses.—Naphthalene is an antiseptic, parasiticide, stimulating expectorant, and a mild irritant. It is used internally in *gastric catarrh* associated with fermentation, in *summer diarrhœa*, and as an expectorant in the later stages of *bronchitis*. Being insoluble in water, it should be *administered* in capsules. In ointments, it is used locally in the treatment of *scabies*, in *pediculi pubis* and *capitis*, and in *tinea tonsurans*. "Coal-tar camphor" is a common household article used to protect woollens against moths.

Incompatibilities.—When triturated dry with phenol or phenyl salicylate, it liquefies.

Dose.—0.01 to 0.3 Gm.; $\frac{1}{6}$ to 5 grains.

NUX VOMICA—Nux Vomica

Family, Loganiaceæ.

Nux vomica is the dried, ripe seed of *Strychnos Nux-vomica*, a medium-sized tree growing in India, Ceylon, Cochin-China, and northern Australia. It should yield not less than 1.25 per cent. of strychnine. The seeds are orbicular, nearly flat, $\frac{2}{5}$ to $1\frac{1}{5}$ inches (10 to 30 mm.) in diameter, $\frac{1}{8}$ to $\frac{1}{5}$ inch (3 to 5 mm.) thick; grayish or greenish-gray externally, the surface covered with short, closely appressed satiny hairs; whitish-gray internally, horny, and very tough; taste intensely and persistently bitter. The powder is of a light gray color.

The drug depends for its medicinal activity upon the alkaloids *strychnine* and *brucine*.

Action and Uses.—Nux vomica is a powerful stimulant to the respiration, circulation, spinal cord, motor nerves, sensory nerves, and to the salivary, gastric, and intestinal glands. Administered in full doses for several days, it gives rise to insomnia, restlessness, and other symptoms commonly known as nervousness.

In *moderate overdoses* it gives rise to muscular twitching or tremor, and in *toxic doses* to rigid convulsions, during which the body is arched backward, the jaw locked, and the respiratory muscles so rigidly convulsed as to prevent respiratory movements. There is, at the same time, violent abdominal pain due to intestinal spasm; unless quickly relieved, death comes on rapidly from cramp asphyxia.

Nux vomica is used as a *bitter tonic*, in *nervous depression*, *gastric* and *intestinal indigestion*, and *loss of appetite;* as a respiratory and circulatory stimulant for relieving *surgical shock*, and in *collapse* from whatever cause; as a powerful respiratory stimulant in *bronchorrhœa*, *emphysema*, *phthisis*, and *opium* and *chloroform poisoning;* and in all other cases where there is profound respiratory *depression;* as a stimulant to the nervous system to overcome various forms of *paralysis*, and in alcoholic and tobacco *amaurosis*. Children and old people are very susceptible to the influence of nux vomica.

Treatment of Poisoning.—In treating cases of Nux Vomica and Strychnine poisoning, patients should be relaxed by inhalation of *amyl nitrite* followed by *chloroform*, and by large doses of *hydrated chloral* and *bromides* by the mouth or rectum.

Incompatibilities.—The alkaloids of nux vomica are precipitated from solution by soluble chlorides, bromides, iodides, cyanides, tannic acid, alkali hydroxides, alkali carbonates and bicarbonates, and by potassio-mercuric iodide. They are decomposed by potassium permanganate.

Dose.—0.06 to 0.3 Gm.; 1 to 5 grains.

Official Preparations and Derivatives

Extractum Nucis Vomicæ (*Extract of Nux Vomica*).—A *powdered extract*, containing 5 per cent. of strychnine, made by exhausting powdered nux vomica with a menstruum of water containing 10 per cent. of acetic acid, concentrating and adding alcohol to precipitate inert constituents, agitating, and, after twenty-four hours, filtering, evaporating, assaying, and, if necessary, adding sugar of milk and reducing to a powder.

Dose.—0.01 to 0.06 Gm.; $\frac{1}{6}$ to 1 grain.

Fluidextractum Nucis Vomicæ (*Fluidextract of Nux Vomica*).—Made with a menstruum of Alcohol, 3 parts; Water, 1 part; and 5 per cent. of Acetic Acid. Each 100 Cc. contains 1 Gm. of strychnine.

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

Tinctura Nucis Vomicæ (*Tincture of Nux Vomica*).—Made by dissolving 2 Gm. of Extract of Nux Vomica (containing 5 per cent. of strychnine) in a mixture of Alcohol, 3 parts, and Water, 1 part, to make 100 Cc. of tincture. Each 100 Cc. of tincture contains 0.1 Gm. of strychnine.

Dose.—0.3 to 1.2 Cc.; 5 to 20 minims.

Strychnina (*Strychnine*). *Formula*, $C_{21}H_{22}N_2O_2$ = 331.73.—Colorless, transparent, prismatic crystals, or a white, crystalline powder, having an intensely bitter taste, being perceptible even in solutions of 1 part of strychnine in 700,000 parts of water. *Soluble* in 6400 parts of water, 110 parts of alcohol. Its solutions give an alkaline reaction with litmus paper. On account of its sparing solubility, it is less frequently employed than strychnine nitrate or sulphate, both of which are more soluble.

Dose.—0.0006 to 0.002 Gm.; $\frac{1}{100}$ to $\frac{1}{32}$ grain.

Strychninæ Nitras (*Strychnine Nitrate*). *Formula*, $C_{21}H_{22}N_2O_2.HNO_3$ = 394.30.—Colorless, glistening needles, having an intensely bitter taste; *soluble* in 42 parts of water, 120 parts of alcohol, and 60 parts of glycerin. Its aqueous solution gives a neutral reaction with litmus paper.

Dose.—0.0006 to 0.002 Gm.; $\frac{1}{100}$ to $\frac{1}{32}$ grain.

Strychninæ Sulphas (*Strychnine Sulphate*).—Colorless, or white, prismatic crystals, or a white, crystalline powder; intensely bitter;

efflorescent in dry air; *soluble* in 31 parts of water, and 65 parts of alcohol.

Dose.—0.0006 to 0.003 Gm.; $\frac{1}{100}$ to $\frac{1}{20}$ grain.

Official Preparations Depending in Part upon Strychnine for their Action and Uses

Ferri et Strychninæ Citras (*Iron and Strychnine Citrate*).—Contains about 0.0006 Gm. ($\frac{1}{100}$ grain) of strychnine in each 0.06 Gm. (1 grain) of the salt.

Dose.—0.06 to 0.2 Gm.; 1 to 3 grains.

Elixir Ferri, Quininæ et Strychninæ Phosphatum (*Elixir of the Phosphates of Iron, Quinine, and Strychnine*).—Each 4 Cc. (1 f℥) contains about 0.001 Gm. ($\frac{1}{60}$ grain) of strychnine.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Glyceritum Ferri, Quininæ et Strychninæ Phosphatum (*Glycerite of the Phosphates of Iron, Quinine, and Strychnine*).—Each Cc. (16 minims) contains about 0.0008 Gm. ($\frac{1}{80}$ grain) of strychnine. *Used* in making the Syrup of the Phosphates of Iron, Quinine, and Strychnine.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

Pilulæ Laxativæ Compositæ (*Compound Laxative Pills*).—Each pill contains 0.0005 Gm. (about $\frac{1}{120}$ grain) of strychnine, along with other important ingredients.

Dose.—1 to 3 pills.

Syrupus Ferri, Quininæ et Strychninæ Phosphatum (*Syrup of the Phosphates of Iron, Quinine, and Strychnine*).—Each 4 Cc. (1 f℥) contains about 0.0008 Gm. ($\frac{1}{80}$ grain) of strychnine, along with other important constituents.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Syrupus Hypophosphitum Compositus (*Compound Syrup of Hypophosphites*).—Each 4 Cc. (1 f℥) contains about 0.00046 Gm. ($\frac{1}{140}$ grain) of strychnine, along with other important constituents.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

OLEA PINGUIA—Fixed Oils

Synonym, Fatty Oils.

Fixed oils are obtained from both the animal and vegetable kingdoms, and differ from the volatile oils in not volatilizing when heated gently. With the exception of the waxes proper, they are glycerides of fatty acids. They are, as a rule, unctuous to the touch, leave a greasy non-volatile stain upon paper, are insoluble in water, are *soluble* in ether, alcohol, benzene, and carbon disulphide. They are known as oils, fats or butters, tallows or waxes, according to their consistency at ordinary temperature. At 20° to 25° C. (60° to 70° F.) the oils are

liquid; the fats are soft, rarely firm; the tallows more firm than fats; while the waxes are hard and more or less brittle. Many of the fixed oils are solvents for resins, camphor, and oleates. They are mostly mixtures of compound ether or ester-glycerides, olein, palmitin, stearin, and butyrin. Liquid oils contain a preponderance of *olein* and the more solid fats a preponderance of *palmitin* and *stearin*, with admixtures of other glycerides. When boiled with alkali hydroxides, the fats undergo saponification, splitting up into glycerin and fatty acids, or a soap of the latter. They are also decomposed, with the formation of glycerin and the fatty acids, when heated with sulphuric acid, or superheated with water under pressure.

When intended for *internal administration*, the fixed oils may be prescribed in soft capsules or emulsion.

The following substances are properly classified under this heading:

Oleum Adipis (*Lard Oil*).—Lard oil is a fixed oil expressed from lard at a low temperature. It is a colorless, or pale yellow liquid, having a peculiar characteristic odor and a bland taste, is *soluble* in ether, chloroform, benzene, and carbon disulphide, but is insoluble in cold alcohol or water. The oil, consisting principally of olein, is used in medicine as an emollient, and in pharmacy, to soften cerates. There are no official preparations of it.

Oleum Amygdalæ Expressum (*Expressed Oil of Almond*). *Synonym*, Sweet Oil.—A clear, pale, straw-colored oily liquid expressed from bitter or sweet almond. (See *Amygdala Dulcis.*)

Dose.—4 to 30 Cc.; 1 to 8 f℥.

Oleum Gossypii Seminis (*Cottonseed Oil*).—A pale, yellowish, oily liquid expressed from cotton-seeds. (See *Gossypium.*)

Oleum Lini (*Linseed Oil*).—A yellowish, oily liquid, expressed from linseed. (See *Linum.*)

Dose.—30 to 60 Cc.; 1 to 2 f℥.

Oleum Morrhuæ (*Cod-liver Oil*). *Synonym*, Oleum Jecoris Aselli.—A pale yellow, thin, oily liquid, having a peculiar, slightly fishy odor, and a bland, fishy taste, obtained from the fresh livers of codfish, *Gadus Morrhua.* It is very sparingly soluble in alcohol, readily *soluble* in ether and chloroform; acid to blue litmus paper, which has been previously moistened with alcohol. It is a mixture of glycerides of stearic, palmitic, jecoleic, therapic, and a small percentage of volatile fatty acids, and in addition contains biliary salts, and minute quantities of bromine, iodine, and phosphorus. The best cod-liver oil is obtained from the carefully cleaned livers of codfish caught off the coast of Norway. The livers are thrown into baskets or barrels, exposed to the sun, when the oil slowly exudes and is removed and filtered. It is also obtained by boiling the livers in water, skimming the oil from the top, and is sometimes purified by freezing and expressing. After long keeping, and upon exposure to the air, cod-liver oil becomes rancid, and is unfit for medicinal use.

Action and Uses.—Cod-liver oil, when taken internally or used by inunction, increases the nutrition, aids in maintaining bodily temperature, increasing the deposition of fat in the tissues, and also increases the number of red corpuscles. In addition to the nutritive value possessed by the oils and fats in common, the biliary salts contained in cod-liver oil aid in its emulsification and in its absorption from the intestines, while the iodine, bromine, phosphorus, and sulphur give to it alterative properties.

When administered before meals in excessive quantities, or to those with feeble digestion, it disorders digestion and impairs the appetite. The oil may be *administered* by inunction, or by the mouth. When given by the mouth, it should be administered *after meals;* at the beginning of treatment in small doses once a day, and gradually increased in frequency and then in larger quantity. When patients do not object to its taste, it may be administered without admixture or may be floated upon coffee, tea, and beer; others prefer to take the oil in an emulsion with acacia, assisted by pancreatin, but most patients prefer it enclosed in soft capsules. Cod-liver oil has been much abused by administering it to individuals suffering from advanced tuberculosis. It is a notable fact that bland oils and fats of every kind are extremely repugnant to such patients, and when given to them often disorder digestion, destroy the appetite, preventing them from taking their normal quantity of food, thus defeating the very object for which it is given, namely, the improvement of general nutrition. It is of value in treating *chronic colds, subacute* and *chronic bronchitis, enlargement of the lymphatic glands, chronic rheumatism, rickets, infantile atrophy,* and *anemia.*

Dose.—0.6 to 15 Cc.; 10 minims to ½ f℥.

Emulsum Olei Morrhuæ (*Emulsion of Cod-liver Oil*).—Prepared by rubbing 125 Gm. of powdered Acacia with 500 Cc. of Cod-liver Oil in a dry mortar until uniformly mixed, then adding 250 Cc. of Water and triturating lightly and rapidly until a thick, homogeneous emulsion is produced, and then adding 4 Cc. of Oil of Gaultheria, 100 Cc. of Syrup, and enough Water to make the product measure 1000 Cc.

Dose.—8 to 16 Cc.; 2 to 4 f℥.

Emulsum Olei Morrhuæ cum Hypophosphitibus (*Emulsion of Cod-liver Oil with Hypophosphites*).—A 50 per cent. emulsion of cod-liver oil, made practically in the same manner as emulsion of cod-liver oil, containing, in addition, 10 Gm. of Calcium Hypophosphite; 5 Gm. of Potassium Hypophosphite; and 5 Gm. of Sodium Hypophosphite in each 1000 Cc.

Dose.—8 to 16 Cc.; 2 to 4 f℥.

Oleum Olivæ (*Olive Oil*). *Family,* Oleaceæ.—A pale yellow, or light yellowish-green, oily liquid, expressed from ripe olives, *Olea europæa.* It has a peculiar odor, a nut-like taste, and a faintly acid reaction. The olive tree growing wild in Asia and southern Europe is almost

shrubby, much branched, and thorny, but the trees cultivated along the Mediterranean coast, in southern California, and in South America are of medium sizes. The fruit is ovoidal, olive-green, and then deep purple; the fleshy portion, or pericarp, is firm, externally greenish, and contains about 70 per cent. of fixed oil, composed mostly of olein, with some palmitin, arachin, and stearin, and a small quantity of cholesterin. It is frequently adulterated with cotton-seed oil.

Action and Uses.—Olive oil is demulcent, emollient, mildly laxative, and is not infrequently employed as a substitute for Cod-liver oil to *improve nutrition*, and as a *laxative* for infants, to *protect* the *mucous membrane* in poisoning from corrosive substances, as a local application for *burns*, and as a *lubricant*. In pharmacy, it is employed as a *basis for liniments*.

Dose.—1 to 30 Cc.; 16 minims to 1 f℥.

Oleum Ricini (*Castor Oil*). *Family*, Euphorbiaceæ.—A pale yellow, almost colorless, transparent, viscid liquid, expressed from the seeds of *Ricinus communis*. The Castor Oil plant in warm climates is a woody bush, in temperate climates, an herbaceous plant, bearing a fruit which is a capsule containing three grayish, marbled, oily seeds about the size of a coffee grain. The oil has a faint, mild odor, and a bland, afterward slightly acrid and generally offensive taste. It consists largely of *triricinolein*, and, in addition, *ricinolein* and *palmatin*, and two highly irritating substances—*ricin*, an unorganized ferment, and *ricinine*, which is found mostly in the shell of the seed.

Numerous cases of poisoning have occurred from castor oil beans, gastro-enteritis being the dominant symptom.

Action and Uses.—By reason of its oily nature, and of the ricin contained in it, castor oil is a purgative, operating usually about four to six hours after being administered; purgation being followed by constipation. By reason of its after-constipating effects, it is rarely employed for the relief of chronic constipation, but is used to *unload the bowel* when they contain fermenting and irritating materials in *acute constipation*, *diarrhœa*, and also in *acute febrile conditions*. It may be *administered* to infants from a warm spoon, to others, floated upon soda water, coffee, tea, beer, or milk, or, still better, in soft capsules. When practicable, it is best administered enclosed in large soft capsules.

Dose.—4 to 30 Cc.; 1 to 8 f℥.

Oleum Theobromatis (*Oil of Theobroma*). *Synonym*, Cacao Butter. *Family*, Sterculiaceæ.—A yellowish-white, solid, fixed oil, obtained from the roasted seeds of *Theobroma cacao*. The chocolate tree growing in South America, Central America, Mexico, and the West Indies grows to the height of about 9 to 12 M. (30 to 40 feet); it bears a large fruit 15 to 17 cm. (6 to 7 inches) long, broadly fusiform, five-celled, at first yellow, then red and purple, with a thick, tough pericarp. The seed contains about 50 per cent. of fixed oil, starch, theobromine, caffeine, proteids, sugar, and coloring matter. Oil of theobroma has a faint

agreeable odor, a bland, chocolate-like taste, is solid and brittle at temperatures below 15° C. (59° F.), and melts at 30° to 35° C. (86° to 95° F.).

Action and Uses.—Oil of theobroma is a nutrient, demulcent, and emollient. It is used in medicine and pharmacy almost exclusively for making suppositories, being suitable for such purposes, as it is solid and brittle at ordinary temperatures, and quickly liquefies at the temperature of the body.

Oleum Tiglii (*Croton Oil*). *Family*, Euphorbiaceæ.—A pale or brownish-yellow, somewhat viscid, slightly fluorescent liquid, expressed from the seeds of *Croton Tiglium*. The plant bearing croton seed is a small tree, 4.5 to 6 M. (15 to 20 feet) in height, growing in India and the Philippine Islands.

The fruit is a three-celled capsule, the size of a hazel-nut, each cell containing a gray-brown, mottled, ovoid seed about ½ inch (12 mm.) long, and ⅓ inch (8 mm.) wide. Croton Oil has a faint, fatty odor, and a mild, oily, afterward acrid, burning taste (poisonous).

It is soluble in about 50 parts of alcohol, freely soluble in ether, chloroform, and in fixed and volatile oils.

Action and Uses.—Croton Oil is an irritant and vesicant to the skin and mucous membrane. When applied to the skin it produces rubefaction or a pustular eruption; administered internally, in doses of one or two drops, it promptly produces copious watery evacuations. Alkalies increase the irritating and purgative effects of the oil. In *overdoses*, it causes violent gastro-enteritis and great prostration.

One-half to one minim, mixed with a few drops of olive oil, is *administered* internally as a *drastic purge* to relieve congestion and restore consciousness in *cerebral congestion* and *cerebral hemorrhages;* 1 part of the oil mixed with 3 parts of olive oil and 1 part of tincture of iodine is employed locally as a *counterirritant* to produce pustulation in *bronchitis, pulmonary congestion, sciatica*, and *chronic rheumatism*. When used in this way, the oil is sometimes absorbed and produces purgation.

Dose.—0.06 Cc.; 1 minim, diluted with a few drops of olive oil.

OLEA VOLATILIA—Volatile Oils.

Volatile oils are liquid preparations, usually obtained by the process of distillation, from the flowers, fruits, seeds, leaves, or bark of odoriferous plants. Oil of cade, oil of tar, and certain other semi-artificial products also come under this heading. When evaporated from filter paper, volatile oils rarely leave a fatty stain, differing in this respect from the fixed oils. In most instances, they are mixtures of the substances to which the odor of the plants are due. When subjected to low temperature, many of them separate into two layers, the top, lighter layer, being known as *eleopten*, and the crystalline, or camphor-like precipitate, being known as *stearopten*.

They are, as a rule, readily *soluble* in alcohol, ether, chloroform, benzene, carbon disulphide, and glacial acetic acid, but are sparingly soluble in water. If water is added to strong or moderately strong alcoholic solutions of a volatile oil, the oil, as a rule, is partly thrown out of solution, giving the mixture a cloudy or milky appearance. Volatile oils should be kept in well-stoppered amber-colored bottles, in a cool place, protected from light.

Oleum Æthereum (*Ethereal Oil*).—A transparent, nearly colorless, volatile liquid, consisting of equal volumes of heavy oil of wine and ether. It has a peculiar, aromatic, ethereal odor, and a pungent, refreshing, bitter taste. It is very sparingly *soluble* in water, and freely soluble in ether and alcohol. It is made by adding Heavy Oil of Wine, obtained as a distillate from a mixture of alcohol and sulphuric acid, to an equal volume of Ether. It is used in the manufacture of Compound Spirit of Ether, commonly known as Hoffman's Anodyne.

Spiritus Ætheris Compositus (*Compound Spirit of Ether*). *Synonym*, Hoffman's Anodyne.—Made by dissolving 25 Cc. of ethereal oil in a mixture of 650 Cc. of alcohol, and 325 Cc. of ether.

Action and Uses.—Compound spirit of ether is a rapidly acting, but fleeting, stimulant to the circulation, an antispasmodic, and a carminative. It is used in the treatment of *angina pectoris*, sudden circulatory depression, such as *fainting*, *surgical shock*, to relieve severe *griping* from *acute indigestion*, to relieve the *pain of menstrual cramps*, and similar *spasmodic pains*. In doses of a few drops, it is considered a sedative and antispasmodic for the relief of *infantile colic*. When added to water, Compound Spirit of Ether produces a milky mixture owing to the separation of the ethereal oil. It should be *administered* in cold water.

Dose.—1 to 4 Cc.; 15 to 60 minims.

Oleum Amygdalæ Amaræ (*Oil of Bitter Almond*).—A poisonous volatile oil, obtained from bitter almond and other seeds containing amygdalin, yielding upon assay not less than 85 per cent. of *benzaldehyde*, and not less than 2 per cent. nor more than 4 per cent. of *hydrocyanic acid*. In *overdoses*, this oil is an active *poison*, giving rise to symptoms similar to and causing death in the same manner as hydrocyanic acid. In minute quantities, it is used as an agreeable flavoring agent. (See also *Amygdala Amara*.)

Dose.—0.015 to 0.03 Cc.; $\frac{1}{4}$ to $\frac{1}{2}$ minim.

Oleum Anisi (*Oil of Anise*).—Obtained from Anise, or the fruit of Star Anise. (See also *Anisum*.)

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

Oleum Aurantii Corticis (*Oil of Orange Peel*).—Obtained by expression from the fresh peel of the Sweet Orange. (See also *Aurantii Dulcis Cortex*.)

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

Oleum Betulæ (*Oil of Betula*). *Synonym*, Oil of Sweet Birch. *Family*, Betulaceæ.—A volatile oil, closely resembling the oil of gaultheria, obtained by maceration and distillation from the bark of sweet birch. The oil of betula contains a considerable quantity of *methyl salicylate*, and is used for the same purpose as oil of gaultheria. (See *Acidum Salicylicum*.)

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

Oleum Cadinum (*Oil of Cade*). *Synonym*, Oleum Juniperi Empyreumaticum. *Family*, Coniferæ.—A product of the dry distillation of the wood of *Juniperus Oxycedrus*. A clear, thick, brown liquid, having a tarry odor, and a burning taste; only partially soluble in alcohol, completely soluble in ether, and almost entirely insoluble in water, but imparts to it an acid reaction.

Action and Uses.—Locally applied to the skin in concentrated form, Oil of Cade is a mild irritant. Incorporated with petrolatum or other ointment bases, it is used as a *parasiticide*, and local stimulant in the treatment of *chronic skin diseases*, such as *eczema*, *psoriasis*, and *favus*.

Oleum Cajuputi (*Oil of Cajuput*). *Family*, Myrtaceæ.—A volatile oil distilled from the fresh leaves and twigs of *Melaleuca leucadendron*, a small tree growing in the East Indies and Australia. Upon assay, this oil should yield not less than 55 per cent. by volume of *cineol*. It is a mobile, colorless, or greenish liquid, having an agreeable, distinctly camphoraceous odor, and an aromatic, slightly bitter taste.

Action and Uses.—Oil of cajuput is a carminative, a mild local anesthetic, a feeble antiseptic, and a parasiticide. It is used internally in the treatment of *diarrhœa* and *flatulency*. Incorporated with ointment bases, it is used in the treatment of *pediculus pubis*, *tinea tonsurans*, and *psoriasis*.

Dose.—0.3 to 1 Cc.; 5 to 15 minims.

Oleum Cari (*Oil of Caraway*).—Obtained by distillation from Caraway, and rectified by steam distillation. (See also *Carum*.)

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims

Oleum Caryophylli (*Oil of Cloves*).—Obtained by distillation from cloves, yielding, upon assay, not less than 80 per cent. by volume of *Eugenol*. (See also *Caryophyllus*.)

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

Oleum Chenopodii (*Oil of Chenopodium*). *Synonym*, Oil of American Wormseed. *Family*, Chenopodiaceæ.—Obtained by distillation from the fruit of *Chenopodium anthelminticum*, a coarse weed growing abundantly in the eastern part of the United States, along roadsides and waste places. The oil is a mobile, colorless, or yellowish liquid, having a peculiar, penetrating, disagreeable, somewhat camphoraceous odor, and a pungent, slightly bitter taste.

Uses.—Oil of chenopodium is used as a *vermifuge*. It may be *given* in emulsion, capsule, or on sugar.

Dose.—0.3 to 0.6 Cc.; 5 to 10 minims, three or four times a day, to be followed by a purgative.

Oleum Cinnamomi (*Oil of Cinnamon*). *Synonym,* Oil of Cassia. *Family,* Lauraceæ.—Obtained by distillation from *Cassia Cinnamon.* Upon assay, it should yield not less than 75 per cent., by volume, of *cinnamic aldehyde.* It is a yellowish, or brownish liquid, becoming darker and thicker upon exposure to air. (See also *Cinnamomum.*)

Dose.—0.06 to 0.5 Cc.; 1 to 8 minims.

Oleum Copaibæ (*Oil of Copaiba*).—Obtained by distillation from Copaiba. (See *Copaiba.*)

Dose.—0.3 to 1 Cc.; 5 to 15 minims.

Oleum Coriandri (*Oil of Coriander*).—Obtained by distillation from Coriander. (See *Coriander.*)

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

Oleum Cubebæ (*Oil of Cubeb*).—Obtained by distillation from Cubeb (See *Cubeb.*)

Dose—0.3 to 1 Cc.; 5 to 15 minims.

Oleum Erigerontis (*Oil of Erigeron*). *Synonym,* Oil of Fleabane. *Family,* Compositæ.—A pale yellow, limpid, volatile liquid, obtained by distillation from the fresh, flowering herb of *Erigeron canadensis,* becoming darker and thicker by age and exposure to the air; having a peculiar, aromatic, persistent odor, and an aromatic, slightly pungent taste.

Erigeron is an annual herb, growing to the height of about 0.3 to 2.5 M. (1 to 8 feet) with linear lanceolate leaves, flowering from July to October, the flowers being numerous, small, white; arranged in terminal panicles, growing abundantly in waste places and fields in North America.

Action and Uses.—Oil of Erigeron is a diffusible stimulant, diuretic, and styptic, its most frequent use is in the treatment of *oozing hemorrhage,* as *menorrhagia* and *epistaxis.*

Dose.—0.3 to 2 Cc.; 5 to 30 minims.

Oleum Eucalypti (*Oil of Eucalyptus*).—Obtained by distillation from the fresh leaves of Eucalyptus, which should yield not less than 50 per cent. by volume of *cineol* (Eucalyptol). (See *Eucalyptus.*)

Dose.—0.3 to 1 Cc.; 5 to 15 minims.

Oleum Fœniculi (*Oil of Fennel*).—Obtained by distillation from Fennel. If partially or wholly solidified, it should be liquefied by warming, and then thoroughly shaken before being dispensed. (See *Fœniculum.*)

Dose.—0.3 to 1 Cc.; 5 to 15 minims.

Oleum Gaultheriæ (*Oil of Gaultheria*). *Synonym,* Oil of Wintergreen. *Family,* Ericaceæ.—A colorless or almost colorless liquid, having a characteristic, strongly aromatic odor, and a sweetish, warm, aromatic taste, distilled from the leaves of *Gaultheria procumbens,* a creeping

plant growing in or below the surface, with ascending branches, indigenous to North America.

Oil of gaultheria contains about 99 per cent. of *methyl salicylate*, being one of the natural sources of salicylic acid. For all practical purposes, it is identical with oil of betula and methyl salicylate.

Action and Uses.—The action of oil of gaultheria, oil of betula, and methyl salicylate is practically the same as that of salicylic acid, except that they are less irritating, and, in addition, are aromatic and carminative. Oil of Gaultheria is used internally in the same class of cases as is salicylic acid, and also locally in the treatment of *articular* and *muscular rheumatism, lumbago,* and *neuralgia.* In many instances, it may be substituted for salicylic acid. (See *Acidum Salicylicum.*)

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

Oleum Hedeomæ (*Oil of Hedeoma*). *Synonym,* Oil of Pennyroyal.—Obtained by distillation from the leaves and tops of Hedeoma. (See *Hedeoma.*)

Dose.—0.06 to 0.6 Cc.; 1 to 10 minims.

Oleum Juniperi (*Oil of Juniper*). *Family,* Coniferæ.—A colorless, faintly green or yellow volatile liquid, having a characteristic odor of Juniper and a warm, aromatic, somewhat terebinthinate, and slightly bitter taste, obtained by distillation from the fruit of *Juniperus communis.* (See *Juniper.*)

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

Oleum Lavandulæ Florum (*Oil of Lavender Flowers*). *Family,* Labiatæ.—A colorless, or light yellow, volatile liquid, having the agreeable odor of lavender flowers, and a pungent, slightly bitter taste. Obtained by distillation from the fresh flowering tops of *Lavanda officinalis.* (See *Lavender.*)

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

Oleum Limonis (*Oil of Lemon*).—Obtained by expression from fresh lemon peel, yielding, when assayed, not less than 4 per cent. of aldehyde, calculated as *Citral.* (See *Limonis.*)

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

Oleum Menthæ Piperitæ (*Oil of Peppermint*).—Obtained by distillation from the fresh or partly dried leaves and flowering tops of peppermint. When assayed, it should yield not less than 6 per cent. of ester, calculated as methyl acetate, and not less than 50 per cent. of total *menthol.* (See *Mentha Piperita.*)

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

Oleum Menthæ Viridis (*Oil of Spearmint*).—Obtained by distillation from the fresh or partly dried leaves, or flowering tops, of spearmint. (See *Mentha Viridis.*)

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

Oleum Myristicæ (*Oil of Mysterica*). *Synonym,* Oil of Nutmeg.—Obtained by distillation from Myristica. (See *Myristica.*)

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

Oleum Picis Liquidæ (*Oil of Tar*).—Obtained by distillation from tar. (See *Pix Liquida.*)

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

Oleum Pimentæ (*Oil of Pimenta*). *Synonym,* Oil of Allspice.—Obtained by distillation from Pimenta, yielding, when assayed, not less than 65 per cent. of *Eugenol.* (See *Pimenta.*)

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

Oleum Rosæ (*Oil of Rose*). *Family,* Rosaceæ.—A pale, yellowish, transparent, volatile liquid, having a strong, fragrant odor of rose, and a mild, slightly sweetish taste, obtained by distillation from the fresh flowers of *Rosa damascena.* The damascena rose bush, bearing highly fragrant flowers, grows in hedge-like rows on the southern slope of the Balkan mountains, Egypt, Persia, and Cashmere. *Aqua Rosæ Fortior* and *Aqua Rosæ* are made by distilling the petals of this variety of rose in water. The oil is used to give an agreeable odor to various pharmaceutical preparations.

Oleum Rosmarini (*Oil of Rosemary*). *Family,* Labiatæ.—A colorless, or pale yellow, limpid, volatile liquid, having an agreeable characteristic pungent odor of Rosemary, and a warm, somewhat camphoraceous taste, obtained by distillation from the fresh flowering tops of *Rosmarinus officinalis.* A small perennial shrub about 1.3 M. (3 to 4 feet) high, with many sessile, evergreen, linear, dark green leaves, and flowering from April to May. The oil, when assayed, should yield not less than 2.5 per cent. of ester, calculated as bornyl acetate, and not less than 10 per cent. of total *borneol.*

Action and Uses.—Oil of Rosemary is a diffusible stimulant, an aromatic, carminative, and emmenagogue. It is *used* internally in the treatment of *flatulency* and *functional amenorrhœa,* and, locally, in the treatment of *sprains, bruises,* and *rheumatism.* It is one of the ingredients of Soap Liniment.

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

Oleum Sabinæ (*Oil of Savin*).—Obtained by distillation from the fresh tops of Savin. (See *Sabina.*)

Dose.—0.3 to 0.6 Cc.; 5 to 10 minims.

Oleum Santali (*Oil of Santal*). *Family,* Santalaceæ.—A pale yellow, volatile liquid, having a peculiar, aromatic odor, and a pungent, spicy taste, obtained by distillation from the wood of *Santalum album.* When assayed, it should yield not less than 90 per cent. of alcohols, calculated as *santalol.* The white sandal-wood trees, from the heartwood of which the oil is obtained, are indigenous to the mountains of India, Malabar, and Java.

Action and Uses.—The oil is a stimulant, expectorant, diuretic, and disinfectant, and is used in the treatment of *gonorrhœa, subacute* and *chronic inflammations* of the *genito-urinary tract,* such as *cystitis* and *pyelitis,* in *subacute bronchitis,* and in *chronic diarrhœa.* It is also

employed in the manufacture of perfumes. When taken internally, it imparts its odor to the breath and urine.

Dose.—0.3 to 1.2 Cc.; 5 to 20 minims.

Oleum Sassafras (*Oil of Sassafras*).—Obtained by distillation from the root, and root bark, of Sassafras. (See *Sassafras.*)

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

Oleum Sinapis Volatile (*Volatile Oil of Mustard*).—Obtained from black mustard freed from its fatty oil by maceration with water and subsequent distillation. It should yield not less than 92 per cent. of allyl iso-thiocyanate. (See *Sinapis Nigra.*)

Dose.—0.006 to 0.016 Cc.; $\frac{1}{10}$ to $\frac{1}{4}$ minim.

Oleum Terebinthinæ (*Oil of Turpentine*).—Recently distilled from turpentine. Used as a solvent. (See *Terebinthina.*)

Oleum Terebinthinæ Rectificatum (*Rectified Oil of Turpentine*).—Prepared by shaking oil of turpentine with an equal volume of solution of sodium hydroxide, and distilling. The oil should be dispensed when oil of turpentine is required for internal administration. (See *Terebinthina.*)

Dose.—0.3 to 2 Cc.; 5 to 30 minims.

Oleum Thymi (*Oil of Thyme*). *Family,* Labiatæ.—Obtained by distillation from the leaves and flowering tops of *Thymus vulgaris,* a small shrub which grows abundantly in the mountains of southern Europe, and also cultivated in gardens. The oil is a colorless, volatile liquid, having a strong odor of thyme, and an aromatic, pungent, and afterward cooling taste. It should yield upon assay not less than 20 per cent., by volume, of phenols, mostly *thymol* mixed with a smaller quantity of *carvacrol.*

Action and Uses.—The oil of thyme is a diffusible stimulant, antispasmodic, emmenagogue, diuretic, antiseptic, and disinfectant, deodorant, parasiticide, and local anesthetic. It is used in the treatment of *flatulency, functional amenorrhœa, gonorrhœa, subacute bronchitis, scabies,* and *muscular rheumatism.*

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

OPIUM—Opium

Synonym, Gum Opium. *Family,* Papaveraceæ.

Opium is a concrete, milky exudate, obtained by incising the unripe capsule of *Papaver somniferum.* In its natural, moist state, it should yield, when assayed according to the *U. S. Pharmacopœia* process, not less than 9 per cent. of crystallized morphine.

The herbaceous plant yielding opium is extensively cultivated in Asia Minor, Persia, China, Egypt, and India, where it grows to a height of 2 to 4 feet (0.5 to 1.0 M.), producing three or four large, white terminal flowers, which are replaced by the fruit, a nearly globular capsule

1 to 3 inches (25 to 75 mm.) in diameter. During May, June, or July, a few days after the flowers have fallen, superficial circular, spiral, or longitudinal incisions are made into the capsules, a process immediately followed by the exudation of a milky fluid, which by the following day becomes a soft solid, and changes to a brownish color. With a knife or other suitable instrument this concrete exudate is scraped from the capsule, formed into irregular, flattened, or more or less rounded masses of variable sizes, and placed upon the market. As seen in the shops, these masses are hard, more or less plastic, grayish-brown externally, and dark brown internally. The drug has a strong narcotic odor, and a bitter, characteristic taste. Its principal alkaloids are *morphine* and *codeine*, but, in addition, it contains *narcotine*, a nauseating alkaloid, narcine, thebaine, papaverine, hydrocotarnine, pseudomorphine, cryptopine, protopine, laudanine, codamine, rhœadine, meconidine, laudanosine, lanthopine, gnoscopine, deuteropine, oxynarcotine, in combinations with meconic and lactic acids.

An historic fact worth mentioning is, that morphine was the first alkaloid discovered and accurately described by Sertürner, in 1817.

Action and Uses.—In medicinal doses, opium relieves pain, induces sleep, checks secretions, and acts as an antispasmodic. Nausea, vomiting, constipation, and headache, are common undesirable after-effects. The drug is administered to relieve the severe *pain of burns, scalds, renal and hepatic colic*, and other excruciating pains; to induce *sleep* when *due to persistent pain;* to check *severe diarrhœa*, and to allay troublesome *cough*. It is also employed *locally* to allay acute *local inflammations*.

On account of its undesirable after-effects, and also by reason of the fact that the "opium habit" may be quickly acquired, opium and all of its preparations are prescribed most cautiously by physicians, usually being employed only in severe, urgent cases, and then only for a short time. It should be specifically understood that all opiates are badly borne by infants and children; fatalities having followed what might be considered minute doses. Gum opium is rarely prescribed, but is used in preparing Powdered Opium and Granulated Opium, both of which contain a somewhat greater percentage of morphine, and are employed in making the official preparations.

Poisoning.—When taken in overdoses, opium produces deep sleep, from which it may be difficult or impossible to arouse the individual; respiration is depressed, the respiratory excursions being reduced from 18 or 20 to the minute, to 12, 10, 8, 4, and finally, arrested. When respiration becomes very slow, the blood becomes charged with carbon dioxide, and the subject is deeply cyanosed; the pupils are markedly contracted, and are commonly described as "pinpoint pupils;" the pulse and temperature are not influenced by the drug until late in the poisoning, when the temperature is lowered, the skin becomes cold and clammy, and the pulse feeble and quick.

Treatment of Poisoning.—Emetics, or the stomach pump, should be employed promptly to evacuate the stomach; this being of special importance in all cases of poisoning by opium, inasmuch as its active principles are in part reëliminated into the stomach after having been previously absorbed. *Potassium permanganate* oxidizes the alkaloids of opium, and is therefore a valuable chemical antidote. A weak solution (1 to 5000) should be used through the stomach tube to irrigate the stomach, or 5 to 10 grains, dissolved in a pint of water, should be administered by the mouth. Tannic acid precipitates the alkaloids of opium, and while useful as a chemical antidote, is less valuable than potassium permanganate. *Strychnine, caffeine,* and *cocaine* are powerful respiratory stimulants, and are, therefore, valuable physiological antagonists to opium. Strychnine sulphate, in the dose of $\frac{1}{20}$ grain, to be repeated if required, should be administered hypodermically, and strong, warm coffee administered by the mouth or *per rectum*. Cocaine hydrochloride, in the dose of $\frac{1}{2}$ grain, administered hypodermically, may be employed to reinforce these physiological antagonists if they do not prove effective. It is important that the respiratory centres should be kept active, so that in addition to the measures above advocated, the patient should be kept aroused by mild flagellations with cold, wet towels, by walking him, by crying loudly into his ears, commanding him to breathe, by the use of the electric brush if required, and if all other measures fail, or as an adjunct to other measures, he may be made to breathe artificially by alternately drawing his arms above his head, so as to draw air into the lungs, and then flexing the arms and carrying them down to his side, and pressing the air out of his lungs.

Official Preparations

Opii Pulvis (*Powdered Opium*).—Opium dried at a temperature not exceeding 85° C. (185° F.), and reduced to a fine powder. Upon assay, it should yield not less than 12 per cent., nor more than 12.5 per cent., of crystallized morphine.

In addition to its medicinal uses, powdered opium is employed in preparing Deodorized Opium, Vinegar of Opium, Extract of Opium, Camphorated Tincture of Opium, Pills of Opium, Powder of Ipecac, and Opium, and Troches of Glycyrrhiza and Opium.

Dose.—0.03 to 0.12 Gm.; $\frac{1}{2}$ to 2 grains.

Opium Granulatum (*Granulated Opium*).—Opium dried at a temperature not exceeding 85° C. (185° F.) and reduced to a coarse powder. Upon assay, it should yield not less than 12 per cent., nor more than 12.5 per cent., of crystallized morphine. In addition to its medicinal uses, granulated opium is used in preparing Tincture of Opium, Tincture of Deodorized Opium, and Wine of Opium.

Dose.—0.03 to 0.12 Gm.; $\frac{1}{2}$ to 2 grains.

Opium Deodoratum (*Deodorized Opium*).—Prepared by treating Powdered Opium with Purified Petroleum Benzin for the purpose of removing its most nauseating alkaloid, *narcotine*, and drying. Upon assay, it should yield not less than 12 per cent., nor more than 12.5 per cent., of crystallized morphine. This is reputed to be the least nauseating of the solid opium preparations.

Dose.—0.03 to 0.12 Gm.; ½ to 2 grains.

Acetum Opii (*Vinegar of Opium*). *Synonym*, Black Drops.—A liquid preparation made by macerating 10 Gm. of Powdered Opium and 3 Gm. of Myristica in Diluted Acetic Acid, straining, expressing, and filtering, dissolving 20 Gm. of Sugar in the filtrate, and, lastly, adding enough Diluted Acetic Acid through the filter to make 100 Cc. of the finished product.

Dose.—0.3 to 1.2 Cc.; 5 to 20 minims.

Emplastrum Opii (*Opium Plaster*).—A plastic, solid preparation containing about 6 per cent. of Extract of Opium, uniformly mixed, by the aid of heat, with Adhesive Plaster. When spread, by the aid of heat upon chamois skin, muslin, or some other suitable material, it is applied locally for the relief of pain. Its effect may be systemic as well as local.

Extractum Opii (*Extract of Opium*).—A powdered extract prepared from Powdered Opium, and containing some Sugar of Milk. Upon assay, it should yield 20 per cent. of morphine. Each grain represents approximately about two grains of opium.

Dose.—0.015 to 0.06 Gm.; ¼ to 1 grain.

Pilulæ Opii (*Pills of Opium*).—Each contains 1 grain (0.06 Gm.) of Powdered Opium, and about ⅓ grain (0.02 Gm.) of Soap. It is thought by some physicians that old pills of opium, that have been permitted to become dry and hard, are more suitable for obtaining the prolonged mild effect of opium than freshly made pills.

Dose.—1 to 2 pills.

Pulvis Ipecacuanhæ et Opii (*Powder of Ipecac and Opium*). *Synonym*, Dover's Powder.—Contains 10 per cent. of Powdered Opium, 10 per cent. of Powdered Ipecac, and 80 per cent. of Sugar of Milk. In addition to the sedative effects of opium, this powder is sometimes used as a diaphoretic. Each 10 grains represent 1 grain of powdered opium.

Dose.—0.3 to 1.2 Gm.; 5 to 20 grains.

Tinctura Ipecacuanhæ et Opii (*Tincture of Ipecac and Opium*).—Made by partially evaporating 1000 Cc. of Tincture of Deodorized Opium, adding 100 Cc. of Fluidextract of Ipecac, filtering, and adding enough Diluted Alcohol to make 1000 Cc. of the finished product.

It will be observed that this liquid is approximately 10 per cent. in opium, as are the other liquid preparations of opium (except Paregoric). It is similar in action and uses to the Powder of Ipecac and Opium, being a diaphoretic, as well as having the other effects of opium.

Dose.—0.3 to 1.2 Cc.; 5 to 20 minims.

Tinctura Opii (*Tincture of Opium*). *Synonym,* Laudanum.—A hydro-alcoholic tincture prepared by the process of maceration and percolation. Ten (10) Gm. of Granulated Opium are used in preparing each 100 Cc. of the tincture. It should contain not less than 1.2 nor more than 1.25 Gm. of crystallizable morphine in each 100 Cc. of the tincture.

Dose.—0.3 to 1.2 Cc.; 5 to 20 minims.

Tinctura Opii Camphorata (*Camphorated Tincture of Opium*). *Synonym,* Paregoric.—A hydro-alcoholic tincture prepared by the process of maceration and percolation. In making 1000 Cc. the following substances are used: Powdered Opium, 4 Gm.; Benzoic Acid, 4 Gm.; Camphor, 4 Gm.; Oil of Anise, 4 Cc.; Glycerin, 40 Cc.; Diluted Alcohol, a sufficient quantity to make 1000 Cc. It will be noted that this is the weakest of the official liquid compounds of opium, being only about 0.4 per cent. strong in opium, instead of 10 per cent., as are all the other official liquid opium compounds. Approximately, there are about 2 grains of powdered opium in each fluidounce of Paregoric.

Caution.—This opiate is not infrequently unwisely administered to children. While weaker in opium, and, therefore, much less powerful in narcotic action than any of the other preparations of opium, its action, like all opiates upon children, is very powerful, and therefore, if administered, the dose should be a few drops only, and not in such doses as stated below, which are intended for adults.

Dose.—2 to 16 Cc.; ½ to 4 f℥.

Tinctura Opii Deodorati (*Tincture of Deodorized Opium*).—A hydro-alcoholic tincture prepared from Granulated Opium. During the process of preparing the tincture, Narcotine is removed by the use of Purified Petroleum Benzin. Ten Gm. of granulated opium are used in making each 100 Cc. of the tincture. It should contain not less than 1.2 nor more than 1.25 Gm. of crystallizable morphine in each 100 Cc. of the tincture. This preparation is reported to be less nauseating than either the tincture, wine, or vinegar of opium.

Dose.—0.3 to 1.2 Cc.; 5 to 20 minims.

Trochisci Glycyrrhizæ et Opii (*Troches of Glycyrrhiza and Opium*).—Each contains about $\frac{1}{12}$ grain (0.005 Gm.) of Powdered Opium and 2½ grains (0.15 Gm.) of Extract of Glycyrrhiza, with Sugar and Oil of Anise.

Vinum Opii (*Wine of Opium*). *Synonym,* Sydenham's Laudanum.—A liquid preparation made by macerating 10 Gm. of Granulated Opium, 1 Gm. of Saigon Cinnamon, and 1 Gm. of Cloves, with a menstruum made in the proportion of Alcohol, 15 Cc., and White Wine, 85 Cc., filtering, and adding enough of the above-named menstruum through the residue to make 100 Cc. of the finished product.

Dose.—0.3 to 1.2 Cc.; 5 to 20 minims.

Official Alkaloids of Opium, their Salts and Compounds

Codeina (*Codeine*). *Formula*, $C_{19}H_{21}NO_3 + H_2O$.—The chemical formula of this alkaloid is quite similar to morphine, the methyl group is chemically combined with the morphine formula ($C_{17}H_{19}(CH_3)NO_3 + H_2O$), and might very aptly be called "methyl morphine."

Codeine is official in the form of white, or nearly translucent, orthorhombic prisms, octahedral crystals, or a crystalline powder. It is odorless, has a faintly bitter taste, and is slightly efflorescent in warm air. The alkaloid is *soluble* in 120 parts of water, 1.6 parts of alcohol, 12.5 parts of ether, and 0.66 part of chloroform. Its aqueous solution is alkaline in reaction. The alkaloid is not precipitated from solution by alkaline carbonates, bicarbonates, nor ammonium carbonate, but is precipitated by most of the other alkaloidal reagents. If added to a solution of the salts of morphine, the last-named substance is precipitated.

Action and Uses.—The alkaloid is quite similar to morphine in its action, except that it is somewhat less powerful. It certainly is less constipating, does not disturb digestion to the same extent, and does not check secretions to the same degree as does morphine. For these reasons, it is more popular as an antispasmodic for checking troublesome *cough*, in those cases where such a remedy is indicated.

Dose.—0.015 to 0.12 Gm.; $\frac{1}{4}$ to 2 grains.

Codeinæ Phosphas (*Codeine Phosphate*). *Formula*, $C_{18}H_{21}NO_3.H_3PO_4 + 2H_2O$.—Fine, white, needle-shaped crystals, or a crystalline powder, without odor, and having a bitter taste. It is *soluble* in 2.25 parts of water, and 261 parts of alcohol. Its aqueous solution is acid in reaction.

Dose.—0.015 to 0.12 Gm.; $\frac{1}{4}$ to 2 grains.

Codeinæ Sulphas (*Codeine Sulphate*). *Formula*, $(C_{18}H_{21}NO_3)_2.H_2SO_4 + 5H_2O$.—Long, glistening, white, needle-shaped crystals, rhombic prisms, or a crystalline powder; efflorescent in air, odorless, and having a bitter taste. It is *soluble* in 30 parts of water, and 1035 parts of alcohol. Its aqueous solution is neutral in reaction.

Dose.—0.015 to 0.12 Gm.; $\frac{1}{4}$ to 2 grains.

Morphina (*Morphine*). *Formula*, $C_{17}H_{19}NO_3 + H_2O$.—Morphine, the chief alkaloid of opium, is seen as white, or colorless, shining, rhombic prisms, or fine needles. It is odorless, has a bitter taste, an alkaline reaction; is permanent in air; *dissolves* in 3330 parts of water, 100 parts of lime water, 168 parts of alcohol, 4464 parts of ether, 1800 parts of chloroform, and is insoluble in benzene. Morphine unites with diluted acids to form salts; is precipitated from solution by potassiomercuric iodide solution, tannic acid, and is oxidized by potassium permanganate. Nitric acid upon crystals of morphine produces an orange-red color, fading to yellow; nitrous acid, or spirit of nitrous

ether, gives a yellow color; nearly neutral solutions of ferric chloride give with it a bluish color changing to a dark brown; iodine unites with it to form iodomorphine.

Action and Uses.—The alkaloid morphine, on account of its sparing solubility, is rarely prescribed, but is used in making the various alkaloidal salts of Morphine. The *salts* are similar in action to Opium, and used for the same purposes. They are all quite soluble and convenient for hypodermic injection.

Incompatibilities.—The various official *salts of morphine* are decomposed, and morphine precipitated from solution, by alkalies, alkali carbonates and bicarbonates, sodium borate, solution of lead subacetate, potassium cyanide, potassium chromate, and tannic acid, and oxidized by potassium permanganate.

Dose.—0.008 to 0.016 Gm.; $\frac{1}{8}$ to $\frac{1}{4}$ grain.

Morphinæ Acetas (*Morphine Acetate*). *Formula*, $C_{17}H_{19}NO_3.C_2H_4O_2 + 3H_2O$.—A white, or yellowish-white, crystalline or amorphous powder, having a faint acetous odor, and a bitter taste. It is *soluble* in 2.25 parts of water, 21.6 parts of alcohol, 480 parts of chloroform, and in 5.2 parts of glycerin, but is insoluble in ether.

Dose.—0.008 to 0.03 Gm.; $\frac{1}{8}$ to $\frac{1}{2}$ grain.

Morphinæ Hydrochloridum (*Morphine Hydrochloride*). *Formula*, $C_{17}H_{19}NO_3.HCl + 3H_2O$.—White, silky, glistening needles or microcrystalline cubes, or a white, crystalline powder, odorless, and having a bitter taste. It is *soluble* in 17.2 parts of water, and in 42 parts of alcohol, but is insoluble in ether or chloroform.

Dose.—0.008 to 0.03 Gm.; $\frac{1}{8}$ to $\frac{1}{2}$ grain.

Morphinæ Sulphas (*Morphine Sulphate*). *Formula*, $(C_{17}H_{19}NO_3)_2.H_2SO_4 + 5H_2O$.—White, feathery, acicular crystals, or cubical masses, odorless, and having a bitter taste. It is *soluble* in 15.3 parts of water, and in 465 parts of alcohol, but is insoluble in ether or chloroform.

Dose.—0.008 to 0.03 Gm.; $\frac{1}{8}$ to $\frac{1}{2}$ grain

Pulvis Morphinæ Compositus (*Compound Powder of Morphine*). *Synonym*, Tully's Powder.—A fawn-colored powder, composed of 1.5 parts of Morphine, 32 parts of Camphor, 33 parts of Powdered Glycyrrhiza, 33.5 parts of Precipitated Calcium Carbonate. The camphor is reduced to a powder by trituration with alcohol. Each grain of the powder contains about $\frac{1}{60}$ of a grain of morphine sulphate, and about $\frac{1}{3}$ of a grain of camphor.

The compound is used chiefly in treating *acute coryza*.

Dose.—0.06 to 0.3 Gm.; 1 to 5 grains.

PANCREATINUM—Pancreatin

A light, fawn-colored, or cream-colored powder, usually obtained from the fresh pancreas of the ox or hog, and consisting principally of the enzymes, *amylopsin*, *myopsin*, *trypsin*, and *steapsin*, with more or less extraneous matter. The powder has a faint, somewhat meat-like taste, and should be free from an unpleasant odor. It is *insoluble* in alcohol, but is slowly but not completely *soluble* in water (10 per cent. remaining undissolved). Upon assay, it should convert not less than *twenty-five* times its own weight of starch into substances soluble in water.

Action and Uses.—This mixture of enzymes digests albuminoids, and converts starch into sugar, dextrin, or maltose; trypsin in alkaline solution converts proteids into peptone; amylopsin converts starches into sugar; steapsin emulsifies fats, and splits them up into glycerin and fatty acids; myopsin has proteolytic action. In addition to these enzymes, there is still another imperfectly understood substance contained in pancreatin which coagulates milk. Pancreatin exerts its digestive properties in neutral, faintly alkaline, and faintly acid media. It is rendered less active by alkaline carbonates, and by pepsin in solution; and is rendered inert by more than a trace of mineral acid and strong alkalies.

Pancreatin is used in *intestinal indigestion*, being considered most valuable in those forms of digestive disturbances due to the imperfect digestion of fats and starches. It is best *administered* in combination with a small quantity of sodium bicarbonate, about two hours after the meal. The drug is extensively employed for predigesting food to be used by persons with feeble digestive powers. *In preparing predigested milk* by pancreatin, about 5 grains of powder, and 20 grains of sodium bicarbonate are dissolved in 3 ounces of tepid water, contained in a small pitcher or other suitable container, 12 ounces of fresh milk previously heated to about 38° C. (100.4° F.) is added, and this temperature of the mixture maintained for about thirty minutes. The food should then be placed in an ice chest and kept cool, otherwise it will become slightly bitter by reason of overdigestion. Other liquid or semiliquid foods may be predigested in practically the same manner.

Incompatibilities.—Alcohol and saturated solution of sodium chloride precipitate pancreatin from its aqueous solutions. Mineral acids and pepsin in solution destroy its digestive properties.

Dose.—0.3 to 1 Gm.; 5 to 15 grains.

PARAFFINUM—Paraffin

Paraffin is a white, waxy, inodorous, tasteless mass, consisting of a mixture of hydrocarbons obtained by cooling and pressing the dis-

tillates from petroleum, having higher boiling points. It is insoluble in alcohol and water, but dissolves in ether, petroleum benzin, benzene, volatile oils, and in warm fixed oils; it is unaffected by cold mineral acids. Paraffin melts at 51.6° to 57.2° C. (125° to 135° F.). It is combustible at a higher temperature, burning with a sooty flame.

Action and Uses.—Paraffin is devoid of any physiological action. It is used in *pharmacy* to raise the melting point of cerates and ointments. It enters into the composition of the Cerate of Lead Subacetate, and the Ointment of Boric Acid.

PARALDEHYDUM—Paraldehyde

Formula, $C_6H_{12}O_3 = 131.10$.

Paraldehyde is a colorless, transparent liquid, having a characteristic, but not unpleasant odor, and a burning, cooling taste. It is usually made by passing hydrochloric acid gas into alcohol, or by treating ethyl aldehyde with sulphur dioxide, hydrochloric acid, zinc chloride, or barium chloride. It is *soluble* in 8 parts of water, and freely miscible with alcohol, ether, and fixed and volatile oils.

Action and Uses.—Paraldehyde is a nerve sedative and hypnotic, and is used for the relief of *insomnia*, not dependent upon pain. In medicinal doses, it has but little effect upon the circulation or respiration, but, in poisonous doses, gives rise to respiratory and circulatory depression. It may be *administered* in water, capsules, or aromatic elixir.

Incompatibilities.—Paraldehyde decomposes iodides, liberating iodine; forms nitrites with hydrocyanic acid, and aldehyde resin with alkalies.

Dose.—1 to 4 Cc.; 15 to 60 minims.

PAREIRA—Pareira

Synonym, Pareira Brava. *Family*, Menispermaceæ.

Pareira is the dried root of *Chondrodendron tomentosum*, a tall, woody, climbing vine growing in Brazil and Peru. The root is seen in the market in subcylindrical, knotty, and somewhat, tortuous cut pieces of various lengths, $\frac{1}{2}$ to $2\frac{1}{3}$ inches (12 to 60 mm.) in diameter; externally blackish-brown, with transverse ridges and fissures and longitudinal furrows; internally yellowish or brownish-gray; odor slight; taste bitter.

The root contains an amorphous principle known as *pelosine*, which is identical with berberine, and also some tannin.

Action and Uses.—Pareira, formerly popular as a diuretic, laxative, and tonic, and rather extensively used in treating *chronic inflammations of the bladder* in aged males, is now rarely prescribed. A decoction, or infusion, made from it would probably be as useful as the fluidextract, which is official.

Official Preparation

Fluidextractum Pareiræ (*Fluidextract of Pareira*).—Made with a menstruum of alcohol, 60 parts; Water, 30 parts; Glycerin, 10 parts.
Dose.—2 to 4 Cc.; 30 to 60 minims.

PELLETIERINÆ TANNAS—Pelletierine Tannate

See *Granatum*.

PEPO—Pepo

Synonym, Pumpkin Seed. *Family*, Cucurbitaceæ.
The dried seed of the Pumpkin, *Cucurbita Pepo*. The seeds are flat, ovate, about $\frac{3}{4}$ inch (20 mm.) long, about $\frac{3}{8}$ inch (10 mm.) wide, and about $\frac{1}{12}$ inch (2 mm.) thick; whitish, or yellowish-white, nearly smooth, with a shallow groove running parallel to its margins upon both sides; the coriaceous seed-coat contains a white, fleshy kernel, which is only slightly odorous when contused, and has a bland oily taste. The seed contains a large quantity of fixed oil and starch, and an acrid resin.
Action and Uses.—Pumpkin seed is a valuable teniafuge and vermifuge; its freedom from taste or harmful effects make it a popular remedy in the treatment of *worms*. The drug is best *administered* in the form of an emulsion, after fasting, and followed by an active cathartic. The emulsion is made by soaking about two ounces of the seed in hot water, removing the coriaceous seed-coats, beating the fleshy portions into a mass with one-half ounce of sugar, adding one dram of acacia, and then stirring while gradually adding four fluidounces of water. This is a sufficient quantity for a single dose.
Dose.—30 Cc.; 1 f℥.

PEPSINUM—Pepsin

Synonym, Scale Pepsin.
Pepsin is a proteolytic ferment or enzyme, obtained from the glandular layer of the fresh stomach of the hog, capable of digesting not less than 3000 times its own weight of freshly coagulated and disintegrated egg albumin. It is seen in white, pale yellow, or yellowish, transparent or translucent scales or grains, or a fine white or cream-colored powder. It should be free from any offensive odor, and should not be more than slightly hygroscopic. It is almost wholly *soluble* in 50 parts of water, more freely soluble in water diluted with hydrochloric acid, and insoluble in alcohol, ether, or chloroform.

It is possible to prepare pepsin of a much higher proteolytic power than that required by the U. S. P., but much of the pepsin upon the market is weaker in digestive properties, and contains a considerable quantity of peptone, mucus, and albumin, which not only render it less active, but also give to it a peculiar disagreeable odor and make it much more hygroscopic. In the presence of weak lactic and hydrochloric acids at the temperature of the body, pepsin has a proteolytic action upon albuminoids, such as casein, albumin, fibrin, etc., liquefying them, converting them into peptones, and preparing them for assimilation.

Action and Uses.—Pepsin is used in *gastric indigestion* due to deficiency of the natural and normal gastric juice. As a rule, the doses given are by far too small to be of any value.

Incompatibilities.—The proteolytic action of pepsin is destroyed by strong hydrochloric acid; it is precipitated from solution by the salts of many heavy metals, and by tannic acid or gallic acid. It should not be given in solution with pancreatin, for if the solution be neutral or alkaline, the pancreatin gradually destroys the pepsin, while in the presence of acids, pepsin destroys the pancreatin.

Dose.—1 to 4 Gm.; 15 to 60 grains.

PETROLATUM—Petrolatum

Petrolatum is an unctuous mass, consisting of a mixture of hydrocarbons, chiefly of the methane series, obtained by distilling off the lighter and more volatile portions of petroleum, and purifying the residue. It is usually prepared from the residue left in stills after distilling off the lighter hydrocarbons (petroleum benzin, naphtha, gasoline, kerosine, etc.), or from the deposit found in crude petroleum storage tanks. In its purified *official form*, petrolatum is about the consistency of an ointment, varying in color from light yellowish to amber; completely amorphous; without odor or taste; *insoluble* in water or cold alcohol, but readily *soluble* in ether, chloroform, carbon disulphide, petroleum benzin, benzene, and fixed and volatile oils. It melts at a temperature ranging between 45° and 48° C. (113° and 118° F.); should not have an acid reaction; is capable of emulsification, but cannot be saponified by alkalies. It remains unaltered, except after very long exposure to light and air, and then only acquires a slight, disagreeable odor of crude petroleum, and becomes darker in color. Cosmoline and Vaseline are similar commercial articles.

Action and Uses.—Petrolatum, when applied to the skin or mucous membrane, is *soothing* and *protective*, but is not absorbed when applied locally, nor digested or absorbed when administered by the mouth. As it is not readily decomposed, and is not altered by acids or oxidizing agents, it furnishes a convenient *ointment basis* for many substances intended for local effect; but, on account of not being absorbable, it is

unsuited as an ointment basis for remedies intended to be absorbed from the skin. Petrolatum does not reduce potassium permanganate, and therefore furnishes a convenient and efficient *excipient* and diluent for that substance. Potassium permanganate may be powdered, made into a mass with hard petrolatum, and moulded into pills, or enclosed in gelatin capsules.

PETROLATUM ALBUM—White Petrolatum

White petrolatum is a colorless or white unctuous mass, consisting of a mixture of hydrocarbons, chiefly of the methane series, obtained by distilling off the more volatile portions from petroleum and purifying the residue. Except in color, it is similar in properties, action, and uses to petrolatum. White petrolatum was introduced into the pharmacopœia as a *basis* for a number of official ointments and cerates. Liquid Alboline is a similar commercial article.

PETROLATUM LIQUIDUM—Liquid Petrolatum

Liquid petrolatum is a colorless, or very slightly yellowish, oily, transparent liquid, consisting of a mixture of hydrocarbons, chiefly of the methane series, obtained by distilling off most of the lighter and more volatile portions from petroleum, and purifying the liquid residue. It should be free from odor or taste; is *insoluble* in water, scarcely soluble in alcohol, but is readily soluble in ether, carbon disulphide, petroleum benzin, benzene, and fixed and volatile oils. It is not oxidizable, saponifiable, nor absorbable. Liquid Alboline and Glycoline are similar commercial articles.

Action and Uses.—Liquid petrolatum is *soothing* and *protective* to mucous membranes, and is employed locally by means of an atomizer to allay inflammation of the nose and larynx, and to soften inspissated secretions within the nares. It furnishes a convenient *vehicle* for volatile oils, camphor, menthol, and a number of other medicines intended for *use by atomization.*

PHENOL—Phenol

Synonym, Carbolic Acid. *Formula,* $C_6H_5OH = 93.34$.

Phenol is obtained from coal-tar by fractional distillation and subsequent purification, and is also made synthetically. It is in colorless, interlaced, or separate, needle-shaped crystals, or a white, crystalline mass, sometimes acquiring a reddish tint; has a characteristic, somewhat aromatic odor; when copiously diluted with water it has a sweetish taste, with a slightly burning after-taste and benumbing effect upon the tongue and mucous membrane of the mouth; when undiluted, it

cauterizes and whitens the skin and mucous membranes. Upon assay, it should contain not less than 96 per cent. of absolute Phenol. The pure chemical, upon exposure, slowly absorbs moisture from the air and is liquefied. It is readily *liquefied* by the addition of 8 per cent. of water; is *soluble* in 19.6 parts of water, very *soluble* in alcohol, glycerin, fixed and volatile oils, ether, chloroform, carbon disulphide, and benzene, but is almost insoluble in petroleum benzin. It coagulates albumin and collodion; is feebly acid to blue litmus paper; forms phenolates with strong bases, and with alkali sulphates forms phenolsulphonates, which are non-toxic. Liquefaction results when phenol is triturated with camphor, hydrated chloral, menthol, thymol, resorcinol, acetanilide, antypyrine, acetphenetidin, phenyl salicylate, and lead acetate.

Action and Uses.—Phenol is a protoplasmic poison, and destructive to animal and vegetable life. In small medicinal doses, it has but little effect upon the circulation, but in large doses depresses the heart and vasomotor system, thereby slowing the pulse and lowering its tension. In toxic doses, the heart stops in diastole. The respiration after small doses is but little or not at all affected, but large doses cause the respiratory movements to become rapid, full, and irregular. In lethal doses, it causes respiratory failure by depressing the respiratory centres. Normal bodily temperature is moderately lowered by medicinal doses of phenol, and greatly reduced by toxic doses. Locally applied, in a state of great dilution, phenol benumbs the tissues, depressing or paralyzing the terminal filaments of the sensory nerves. When concentrated, it first produces a burning sensation, followed later by numbness, and, at the same time, whitens or bleaches the skin or mucous membrane. It coagulates albumin; does not penetrate the tissues deeply, and therefore is not a severely destructive cauterant. Solutions in glycerin or oils are rapidly absorbed from the skin and stomach.

In the strength of about 2 per cent., phenol is a germicide, and while one of the feeblest disinfectants, it is at the same time one of the most dangerous and most widely used.

Its disadvantages as an antiseptic lie in the fact that it benumbs the hands of the surgeon, and if used over large areas of the body is liable to become absorbed and poison the subject. In recent years, attention has been forcibly directed to the fact that phenol, even in a state of great dilution, when applied upon dressings to the fingers or toes may cause gangrene of the member, in many instances necessitating their amputation.

In addition to its use as a surgical antiseptic, a weak aqueous solution of phenol (1 minim in an ounce of water) is employed as a mouth wash, gargle, and as a spray for the throat and nose. It is also used as a disinfecting wash for *ulcers*, *abscesses*, *boils*, and *carbuncles*. Phenol is a local anesthetic and antiphlogistic; its powers as such may be enhanced by triturating it with camphor or menthol. Ointments made by incorporating the liquid thus formed with petrolatum are valuable

as a local application for painful *boils, carbuncles, buboes,* or other local infections prior to suppuration.

Phenol is of little value for internal administration. In doses of ½ to 2 grains, well diluted, it is occasionally administered to check *vomiting,* and as an *intestinal antiseptic.*

To insure complete and rapid solution of phenol in water, small quantities of glycerin are frequently added.

Poisoning.—Phenol, one of the deadliest and quickest of poisons, is commonly used as a household disinfectant, and, therefore, is so easily procured that poisoning by it is common. Fatalities have followed quantities of less than 30 grains, and recovery under treatment has ensued after as great a quantity as 1 ounce; a dram is commonly considered a lethal quantity. Numerous cases of poisoning have resulted from absorption after its local application. Several instances are recorded in which poisoning of infants resulted from the local application of very small quantities.

When taken into the mouth and swallowed in concentrated form, the mucous membranes of the lips, mouth, and the pharynx are corroded and stained; *white,* if pure phenol has been taken; *black,* if impure; the eschars are surrounded by reddened, inflamed zones. Death may follow almost instantaneously, or within a few hours. If the dose is large, and death is not instantaneous, the individual vomits, purges, and is cyanosed; the voice is hoarse; respiration irregular, rapid, and deep; the pulse feeble and running; the skin is cold and covered with sweat; the urine dark and albuminous. Muscular twitchings, vertigo, headache, delirium, and, in fatal cases, coma is common. At *autopsy,* the odor of phenol is distinct when the stomach is opened; characteristic eschars are found within the mouth, œsophagus, stomach, and often in the intestines; the brain, kidneys, liver, and spleen are filled with dark grumous blood.

Treatment of Poisoning.—We have no reliable antidote for phenol. The stomach should be irrigated with a strong solution of magnesium sulphate, with the object of forming non-toxic, although soluble, magnesium phenolsulphonate, and also for washing away the poison. After thoroughly irrigating, 6 to 10 ounces of the solution should be introduced and permitted to remain in the stomach; venous injections of solution of sodium sulphate are administered with the hope of chemically altering such phenol as may have been absorbed; hypodermic injections of strychnine and atropine should be administered in an attempt to support the failing circulation and respiration. Raw eggs, milk, and saccharated lime are looked upon as of value.

Oils, alcohol, and glycerin are solvents for phenol, and, if administered in cases of poisoning by that substance, dissolve it and promote its more rapid absorption. They are, therefore, to be avoided.

Alcohol, if used quickly, is a most valuable agent for preventing ill effects from the local application of phenol. The hands may be dipped into liquefied phenol and instantly thereafter washed in a basin

of alcohol without the individual experiencing any noticeable ill effect. Alcohol is *not*, however, a reliable antidote in cases of poisoning by phenol.

Incompatibilities.—Antipyrine, acetanilide, acetphenetidin, phenyl salicylate, lead acetate, hydrated chloral, camphor, menthol, thymol, and resorcinol, if triturated with phenol, are liquefied; solutions of hydrogen dioxide and potassium permanganate oxidize it; magnesium sulphate, sodium sulphate, and potassium sulphate form with it soluble phenolsulphonates; alcohol neutralizes the caustic effect of phenol; oil of theobroma is softened by it; and collodion and albumin are coagulated by it.

Dose.—0.03 to 0.12 Gm.; ½ to 2 grains.

Official Preparations

Phenol Liquefactum (*Liquefied Phenol*).—A liquid composed of not less than 86.4 per cent., by weight, of absolute Phenol (C_6H_5OH), and about 13.6 per cent. of water. It is prepared by melting Phenol, adding 10 per cent. of Water, and thoroughly mixing. Liquefied phenol dissolves in 12 parts of water, and is *miscible* in all proportions with alcohol and glycerin. It is convenient for dispensing, and is usually supplied when phenol is called for.

Dose.—0.03 to 0.12 Cc.; ½ to 2 minims.

Unguentum Phenolis (*Ointment of Phenol*). *Synonym*, Carbolic Acid Ointment.—Prepared by thoroughly incorporating 3 Gm. of Phenol with 97 Gm. of melted White Petrolatum. For most purposes, this ointment is too strong, and should be reduced by the addition of white petrolatum.

Used locally.

PHENYLIS SALICYLAS—Phenyl Salicylate

Synonym, Salol. *Formula*, $C_{13}H_{10}O_3 = 212.47$.

Phenyl salicylate is the salicylic ester ($C_6H_4(OH)COOC_6H_5$.1 : 2) of phenyl. It is obtained by the action of salicylic acid upon phenol in the presence of acid chlorides, such as phosphoryl chloride ($POCl_3$), or carbonyl chloride ($COCl_2$). It is a white, crystalline powder, having a faint, aromatic odor, and a slight, but characteristic taste.

It is very sparingly soluble in water; *dissolves* in 5 parts of alcohol, and is very soluble in ether, chloroform, and fixed and volatile oils.

Action and Uses.—Phenyl salicylate passes through the stomach unchanged, but, in the presence of the alkaline juices of the intestines and the pancreatic juices, decomposes, yielding about 36 per cent. of phenol, and 64 per cent. of salicylic acid. It is employed as an intestinal and *urethral antiseptic*, and as an *antirheumatic*. Large doses sometimes give rise to the mild physiological effects observed after

full doses of phenol, and after full doses of salicylates. The chemical may be *dispensed* in powders, capsules, pills, or wafers, but not in compressed tablets.

In pharmacy, it furnishes a suitable *coating for pills* intended to act within the intestines. Such pills may be coated by dipping them into phenyl salicylate melted at a temperature of about 42° C. (107.6° F.).

Incompatibilities.—Phenyl salicylate liquefies when triturated with phenol, hydrated chloral, betanaphthol, and thymol, and forms a damp powder which quickly dries when triturated with antipyrine.

Dose.—0.12 to 0.6 Gm.; 2 to 10 grains.

PHOSPHORUS—Phosphorus

Symbol, P = 30.77.

Phosphorus is a non-metallic element prepared from bone. In preparing it, calcium phosphate, usually obtained from the bones of sheep, which are richer in this substance than other animals, is converted into acid calcium phosphate by treating it with sulphuric acid and water; the mixture is then strained to free it from calcium sulphate, evaporated to a syrupy consistency, mixed thoroughly with powdered charcoal and heated to redness. The mass thus formed is transferred to an earthen retort fitted with an adapter of copper, bent at right angles so that its extremity dips beneath the water; heat is now applied, and the phosphorus distils over and drops into the water without coming in contact with the air.

In its official form, phosphorus is a translucent, nearly colorless solid, usually seen in short cylindrical rolls, which has a waxy luster, and when long kept becomes covered with a whitish film or crust, and is about the consistency of beeswax. Even in a state of great dilution it has a garlicky odor and taste. When exposed to the air, it emits white fumes which are luminous in the dark, and upon longer exposure, by reason of its rapid oxidation, takes fire spontaneously. It should be kept underneath water in strong bottles.

Phosphorus is almost entirely *insoluble in water*, to which, however, it imparts its odor and taste; it is *soluble* in about 25 parts of chloroform, in 50 parts of fatty oil, in 80 parts of absolute ether, and in 350 parts of alcohol. It is freely soluble in carbon disulphide, such a solution being inflammable.

Much of the phosphorus upon the market is contaminated by arsenic and sulphur. In addition to the wax-like phosphorus, there are several allotropic forms of the substance obtainable. Of these, the most common is red, or amorphous, made by heating the waxy variety in the presence of carbon dioxide; this variety is only feebly toxic, does not ignite spontaneously, and is used in the manufacture of lucifer matches.

Action and Uses.—In medicinal doses, phosphorus is a tonic to the nervous tissues, and stimulates the growth of bones. It is used in treating cases of *nervous exhaustion*, *neuralgia*, *rachitis*, *osteomalacia*,

and similar diseased conditions. Neither phosphoric acid, phosphates, lactophosphates, nor hypophosphites act like phosphorus, and should not be used as a substitute for that element.

Acute Poisoning.—When taken in overdoses, either in its official form, or, as is more usual, in match-heads or rat-paste, the element is highly toxic. While symptoms of poisoning may come on quickly and lead to an early fatality, phosphorus is one of the few toxic substances of which the symptoms of poisoning are commonly delayed for from eight to ten hours after the poison has been swallowed. Usually there is a burning sensation in the œsophagus, stomach, and abdomen, the breath has a garlicky odor, and this is followed or accompanied by nausea and vomiting, the ejected matter being luminous in the dark, has the odor of phosphorus, and, in addition to the ordinary gastric contents, may contain bile or blood. The bowels may be constipated, but more frequently diarrhœa accompanies the vomiting, and the ejecta, like the vomitus, is luminous in the dark. Not infrequently there is a cessation or great amelioration in the symptoms after twenty-four to forty-eight hours, which lead to false hopes, for after a few hours there may be tenderness and swelling over the liver; jaundice, first seen in the conjunctival and then over the whole body; there is renewed vomiting, the ejecta containing altered blood resembling coffee-grounds. The bowels are now constipated, but if a bowel movement is secured the fecal material is white or clay-colored, showing an absence of bile. The urine is scanty, albuminous, and, in addition, contains leucin, tyrosin, sarcolactic acid, biliary acids and pigments, hypophosphorous acid, and, not infrequently, fat globules and tube casts. Headache, muscular twitching, and erotic convulsions are frequent, and are accompanied or followed by unconsciousness. In cases which do not recover, death may follow soon, or ensue later from widespread fatty degeneration of the vital organs, and damage to the digestive tract or kidneys.

Treatment of Acute Poisoning.—When taken in overdoses, phosphorus and preparations of it adhere tenaciously to the walls of the stomach and all the mucous membranes of the digestive tract with which it comes in contact, and cannot be entirely removed by irrigation or purgation. In addition to these measures, some substance which will act chemically must be used. This may be accomplished by washing out the stomach with a 0.5 per cent. solution of potassium permanganate, allowing some of the solution to remain in the stomach. Other substances of asserted value are copper sulphate as an emetic and chemical antidote, and Old French Oil of Turpentine to oxidize the remaining phosphorus. Old French Oil of Turpentine is difficult to obtain, and copper sulphate being in itself highly toxic is not as safe as potassium permanganate. Measures to free the *intestines* from all of the poison by the use of purgatives and chemical antidotes are of no less importance than freeing the *stomach* of the poison. Fatty oils, being solvents for phosphorus, are likely to increase absorption and should *not* be administered.

Chronic Poisoning.—Not only do we have acute poisoning from phosphorus, but workers engaged in manufacturing matches suffer from *necrosis of the lower jaw* as a result of inhaling the fumes. By careful attention to the teeth, having all cavities filled, and giving proper care of the gums, chronic poisoning may be avoided by matchmakers and others working with phosphorus.

Incompatibilities.—As phosphorus is readily oxidizable, it is incompatible with all ready oxidizers, such as solution of hydrogen dioxide, potassium chlorate, potassium bichromate, potassium permanganate, potassium nitrate, mercuric oxides, lead oxide, sulphur, and sulphides. It is also incompatible with bromine, chlorine, iodine, and cupric sulphate.

Administration.—Considering its instability, it is evident that this chemical should never be given in conjunction with any oxidizing agent. The remedy is most conveniently administered in pills, which should be coated with tolu, as are the official pills of phosphorus, or it may be dissolved in a fatty oil for administration. The Elixir of Phosphorus, formerly official, is an agreeable preparation; it contains about $\frac{1}{64}$ grain of phosphorus in each fluidram of the elixir.

Dose.—0.0005 to 0.001 Gm.; $\frac{1}{128}$ to $\frac{1}{64}$ grain.

Official Preparation

Pilulæ Phosphori (*Pills of Phosphorus*).—Each contains $\frac{1}{100}$ of a grain (0.0006 Gm.) of phosphorus, and is coated with tolu.

Dose.—One to three pills.

PHYSOSTIGMA—Physostigma

Synonym, Calabar Bean. *Family,* Leguminosæ.

Physostigma is the ripe bean of *Physostigma venenosum*, a climbing, woody plant growing in western Africa near the mouths of the Niger and Old Calabar Rivers. The bean is hard, somewhat reniform and oblong, of a reddish or chocolate-brown color, has a brownish-black groove extending along its convex edge, and is about $\frac{3}{4}$ to 1 inch (18 to 25 mm.) long, $\frac{2}{5}$ to $\frac{3}{5}$ inch (10 to 15 mm.) thick. When crushed, it is whitish within, and has a bean-like and heavy odor. Its taste is at first starchy, afterward acrid. The seeds should contain not less than 0.15 per cent. of ether-soluble alkaloids. Its most important constituent is the alkaloid *physostigmine*, commonly known as *eserine*, it also contains another alkaloid known as *calabarine*.

Action and Uses.—Physostigma, and its principal alkaloid Physostigmine, in medicinal doses has but little effect upon the respiration and circulation, but, if any, is a depressant rather than a stimulant. It is a mild nerve sedative, and a stimulant to the unstriped muscular fibers. When an aqueous solution is instilled into the eye it contracts

the pupil, and also increases intra-ocular tension. Preparations of the drug are used to relieve, or prevent, the *spasms of tetanus*, and similar *spasms*. It is also used in combination with other remedies to overcome *chronic constipation*, and also as a stimulant to the unstriped muscles of the bronchioles to aid in the expulsion of mucus in cases of *emphysema*. The alkaloid physostigmine may also be employed for the same purposes, and, in addition, is used locally in the eye to overcome mydriasis produced by atropine, in the treatment of *corneal ulcers*, and to reduce intra-ocular tension in cases of *glaucoma*.

Poisonous Actions.—Poisoning from physostigma is rare. In toxic doses, it causes muscular tremor, total relaxation, circulatory and respiratory failure, and contracted pupils; vomiting, while common, may not occur.

Treatment of Poisoning.—The treatment of poisoning consists in the administration of atropine, strychnine, and digitalis, and the application of external heat. The stomach, of course, should be evacuated.

Dose.—0.06 to 0.2 Gm.; 1 to 3 grains.

Official Preparations and Alkaloidal Salts

Extractum Physostigmatis (*Extract of Physostigma*).—A dry, powdered extract of physostigma containing 2 per cent. of ether-soluble alkaloids.

Dose.—0.004 to 0.008 Gm.; $\frac{1}{16}$ to $\frac{1}{8}$ grain.

Tinctura Physostigmatis (*Tincture of Physostigma*).—A 10 per cent. tincture of physostigma, containing 0.014 Gm. of ether-soluble alkaloids of physostigma in each 100 Cc. of the tincture. Made by percolating 10 Gm. of Physostigma with Alcohol to make 100 Cc. of tincture.

Dose.—0.3 to 1.2 Cc.; 5 to 20 minims.

Physostigminæ Salicylas (*Physostigmine Salicylate*). *Synonym*, Eserine Salicylate.—A colorless, or faintly yellowish, crystalline alkaloidal salt, which acquires a reddish tint when long exposed to light and air; is *soluble* in 72.5 parts of water, 12.7 parts of alcohol, 175 parts of ether, and 8.6 parts of chloroform.

Dose.—0.0004 to 0.0006 Gm.; $\frac{1}{150}$ to $\frac{1}{100}$ grain

Physostigminæ Sulphas (*Physostigmine Sulphate*). *Synonym*, Eserine Sulphate.—A whitish, or yellowish-white, micro-crystalline powder, gradually turning reddish upon exposure to air and light. Very deliquescent, *freely soluble* in water, alcohol, and chloroform.

Dose.—0.0004 to 0.0006 Gm.; $\frac{1}{150}$ to $\frac{1}{100}$ grain.

PHYTOLACCA—Phytolacca

Synonym, Poke Root. *Family*, Phytolaccaceæ.

The dried root of *Phytolacca decandra*, an herb growing in waste places throughout North America. The root collected late in November is seen in cylindrical, tapering pieces, or longitudinal slices; externally

yellowish-brown, longitudinally or spirally wrinkled; taste sweetish, afterward strongly acrid. Its active principle is probably the acrid *resin*, but, in addition, it contains *asparagin*, tannin, and mucilage.

Action and Uses.—In small medicinal doses, the drug is looked upon as an *alterative*, and is of value in treating *subacute* and *chronic rheumatism*. In full medicinal doses, it is an *irritant* to the gastro-intestinal mucous membrane, and induces vomiting and purging. In *overdoses*, it gives rise to gastro-enteritis, convulsions, and great prostration.

Dose.—0.06 to 0.3 Gm.; 1 to 5 grains.

Official Preparation

Fluidextractum Phytolaccæ (*Fluidextract of Phytolacca*).—Made with a menstruum of diluted alcohol.

Dose—0.06 to 0.3 Gm.; 1 to 5 minims.

PILOCARPUS—Pilocarpus

Synonym, Jaborandi. *Family*, Rutaceæ.

The dried leaflets of *Pilocarpus Jaborandi* and *Pilocarpus microphyllus*, yielding, when assayed by the process given in the U. S. P., not less than 0.5 per cent. of alkaloids. The plant yielding the drug is a woody shrub, growing mostly in the northeastern part of Brazil.

The leaflets of *Pilocarpus Jaborandi* have a very short leaf stalk, its blades are about $2\frac{1}{2}$ to 5 inches (6 to 12 cm.) long, $\frac{3}{4}$ to $1\frac{1}{2}$ inches (2 to 4 cm.) broad, oblong or ovate in shape, usually unequal at their base, blunt and emarginate at their summits, entire and narrowly revolute along their margins, coriaceous in texture, yellowish-green in color, and have a bitterish, slightly salty, aromatic, afterward pungent taste.

The leaflets of *Pilocarpus microphyllus* are smaller than those of *Pilocarpus Jaborandi*, are rhomboidally oval or ovate, acute at their bases, blunt and unequally emarginate at their summits, and dull green in color.

Pilocarpus depends for its medicinal properties upon the non-crystalline alkaloid *pilocarpine*, and, in addition, contains *isopilocarpine*, and a resinous substance which, in their combined state, is known as *Jaborine*.

Action and Uses.—The most noticeable effect produced by pilocarpus is profuse sweating, salivation, nausea, and very often vomiting. It is a depressant, rather than a stimulant, to the circulation. When instilled into the eye, pilocarpus markedly contracts the pupil. Even when administered only in full medicinal doses, the drug, or its alkaloid, is not always free from very disagreeable and sometimes dangerous effects; collapse, disorder of vision, vertigo, intractable vomiting, and occasionally œdema of the lungs have followed its administration.

Pilocarpus, its preparations, or, still more frequently, one of the salts of pilocarpine is employed in treating *renal dropsy, pleurisy with effusion, opacity of the vitreous humor of the eye,* as a myotic, to reduce increased intra-ocular tension, for *aural vertigo,* and to abort *erysipelas* and oncoming *malarial paroxysms.*

Dose.—2 to 4 Gm.; ½ to 1 ʒ, in infusion.

Official Preparations and Alkaloidal Salts

Fluidextractum Pilocarpi (*Fluidextract of Pilocarpus*).—Made with a menstruum of diluted alcohol. Each 100 Cc. should contain 0.4 Gm. of alkaloids from Pilocarpus.

Dose.—2 to 4 Cc.; ½ to 1 fʒ.

Pilocarpinæ Hydrochloridum (*Pilocarpine Hydrochloride*). *Formula,* $C_{11}H_{16}N_2O_2.HCl$ = 242.81.—This alkaloidal salt is crystalline, transparent, colorless or white, faintly bitter, deliquescent, and *freely soluble* in alcohol and water. For prompt effect, it is usually administered hypodermically.

Dose.—0.008 to 0.03 Gm.; ⅛ to ½ grain.

Pilocarpinæ Nitras (*Pilocarpine Nitrate*). *Formula,* $C_{11}H_{16}N_2O_2.HNO_3$ = 269.20.—This alkaloidal salt is seen as colorless, or white, shining crystals, having a faintly bitter taste. It is *permanent* in air, and *soluble* in 4 parts of water, and 60 parts of alcohol. For prompt action, it is usually administered hypodermically.

Dose.—0.008 to 0.03 Gm.; ⅛ to ½ grain.

PIMENTA—Pimenta

Synonym, Allspice. *Family,* Myrtaceæ.

Pimenta, or Allspice, as it is commonly called, is the carefully dried fruit of *Pimenta officinalis,* an evergreen tree growing to the height of about 30 feet in the West Indies, Mexico, and South America. The fruit or berry is gathered when it has about reached its full growth, but is still green. As met with in the shops, it is subglobular, about ¼ to ⅓ inch (5 to 7 mm.) in diameter, dark brown, 2-celled, each containing a reddish-brown seed, and has an agreeable, aromatic odor and taste.

Upon distillation, the fruit yields a colorless or light yellowish, aromatic oil, composed largely of *eugenol,* and also contains a resin, tannin, and other less important constituents. The drug should be freshly ground when needed.

Action and Uses.—Pimenta is a mild stimulant, stomachic, and carminative; its aroma is mildly sedative. The powdered drug, or a tea made from it, is used to relieve *flatulence, nausea,* and *intestinal colic.* In combination with other ground spices, pimenta is used locally in a poultice as a mild *counterirritant* to allay intestinal pains. It is

one of the spices used in preparing Aromatic powder and Aromatic Fluidextract.

Dose.—0.06 to 0.6 Gm.; 1 to 10 grains.

Official Derivative

Oleum Pimentæ (*Oil of Pimenta*).—A colorless, yellowish, or reddish volatile oil, obtained by distillation from pimenta, containing not less than 65 per cent. by volume of Eugenol. It is freely *miscible* with alcohol.

Action and Uses.—Oil of pimenta is a stimulant, carminative, and aromatic, and is used in *diarrhœa* mixtures, in combination with purgatives to *prevent griping*, and as a *flavoring agent.*

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

PIPER—Pepper

Synonym, Black Pepper. *Family*, Piperaceæ.

Pepper is the dried, unripe fruit of *Piper nigrum*, a perennial, trailing or climbing vine, grown in India, Malabar, Philippine Islands, Java, West Indies, and many other tropical countries. The berries are gathered just before they have reached full development. As seen in the market, they are nearly globular, $\frac{1}{8}$ to $\frac{1}{5}$ inch (4 to 5 mm.) in diameter; externally brownish or grayish-black; pericarp thin, coarsely wrinkled, enclosing a single, whitish, or more or less imperfectly developed seed; odor strong, penetrating, provoking sneezing; taste aromatic and very pungent. Pepper contains *piperine*, a feebly basic substance, a volatile oil, and a pungent resin.

Action and Uses.—*Locally*, pepper is an irritant, and is used in poultices as a counterirritant. Taken *internally*, it is a stimulant to the mucous membrane of the stomach and bowels, and is used to *stimulate digestion*, and as a *carminative*. Piperine has been used in *malaria* as an antiperiodic, its value as such, however, is probably owing to the fact that when given with quinine it promotes the more rapid and perfect absorption of that alkaloid.

Dose.—0.3 to 1 Gm.; 5 to 15 grains.

Official Derivative and Preparation

Oleoresina Piperis (*Oleoresin of Pepper*).—A dark, thick liquid, prepared by percolating ground pepper with acetone, then evaporating the acetone, cooling, straining through cotton to separate piperine. The most suitable *method for dispensing* oleoresin of pepper is in pills or capsules. It is often added to purgatives to promote their efficient action and prevent griping.

Dose.—0.015 to 0.06 Gm.; $\frac{1}{4}$ to 1 minim.

Piperina (*Piperine*). *Formula*, $C_{17}H_{19}NO_3$ = 283.04.—Piperine, a feebly basic substance, commonly considered a feeble alkaloid, is obtained from pepper and other plants of the Piperaceæ. It appears in colorless, or pale yellowish, glistening crystals; odorless; put into the mouth it is first tasteless, but upon prolonged contact it develops a sharp, biting taste. The chemical is permanent in air, insoluble in water; *soluble* in 15 parts of alcohol.

Dose.—0.06 to 0.3 Gm.; 1 to 5 grains.

PIX LIQUIDA—Tar

Family, Pinaceæ.

Tar is obtained by the destructive distillation of the wood of *Pinus palustrus*, commonly known as the long leaf pine tree, which grows abundantly in the southern United States. It is semiliquid, viscid, blackish-brown, non-crystalline, translucent in thin layers, becoming granular and opaque with age; has an empyreumatic, terebinthinate odor, and a sharp empyreumatic taste. It *dissolves* in alcohol, fixed or volatile oils, solutions of potassium hydroxide; it is heavier than water and slightly soluble in it, the solution being of a pale yellowish-brown color and having an acid reaction. Tar contains volatile oils, resins, guaiacols, pyroligneous acid, and many empyreumatic products.

Action and Uses.—Tar is a mild irritating stimulant to the skin, in some susceptible individuals its local application gives rise to inflammation, with pustular eruption; it is also a stimulant to the mucous membranes of the bronchi, stomach, and bowels; a renal stimulant, and in large doses an irritant to the genito-urinary tract.

It is used internally in syrups, infusions, or pills as a stimulating expectorant for *subacute* and *chronic bronchitis;* locally, combined with a convenient ointment base, it is employed in treating obstinate *eczema* and *psoriasis*. The oil of tar is similar in action to tar, being, however, less irritating and also more suitable for addition to fluids intended to be used as a spray by means of an atomizer.

Official Derivative and Preparations

Oleum Picis Liquidæ (*Oil of Tar*).—A volatile oil distilled from tar. When first distilled it is almost colorless, but soon acquiring a dark, reddish-brown color, and a strong, tarry odor, and taste. The oil is used internally as an expectorant, and well diluted with oil as a local application in treating *subacute* or *chronic inflammation of the throat* and *nose*.

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

Syrupus Picis Liquidæ (*Syrup of Tar*).—Prepared by triturating 5 Gm. of Tar (previously mixed with sand, washed with cold water, and treated with alcohol, so as to free it from impurities) with 10 Gm.

of Magnesium Carbonate and 50 Gm. of Sugar, adding 400 Cc. of Water, stirring for two hours, filtering, and dissolving 800 Gm. of Sugar in the filtrate, and, lastly, adding enough Water to make 1000 Cc. of the finished product.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Unguentum Picis Liquidæ (*Tar Ointment*).—Made by melting 15 Gm. of Yellow Wax, adding 35 Gm. of Lard, incorporating 50 Gm. of Tar previously warmed, straining the whole through muslin, and stirring until it congeals.

Used locally in treating *chronic inflammatory diseases of the skin.*

PLUMBUM (Lead) AND ITS SALTS AND COMPOUNDS

Of the official salts of lead, the *acetate* and *nitrate* are soluble in water, while the *iodide* and *oxide* are practically insoluble. The word *insoluble* is used in a relative sense only in this connection, for the iodide is dissolved by 1300 parts of water; the oxide is soluble to a still lesser degree, but imparts a faintly alkaline reaction to water. Metallic lead when in contact with very pure water forms salts, which enter solution to a very slight extent; but if the water contains sulphates or carbonates, it produces a slight coating upon the metal, and thereby prevents solution. The soluble salts of lead have a sweetish astringent, afterward metallic taste.

Incompatibilities.—The salts and compounds of lead are incompatible with sulphates, sulphides, carbonates, chlorides, bromides, iodides, chromates, borates, and tannic acid, the soluble salts being precipitated from solution by these substances. In neutral solution the salts of lead precipitate alkaloids, glucosides, neutral principles, gums, and resins. All the salts and compounds of lead are more or less toxic, the nitrate being most violently so.

Acute Poisoning.—In acute poisoning, the symptoms of gastro-enteritis, with abdominal pain, are the most marked; obstinate constipation is more frequently present than diarrhœa, the stools being black in color as a result of the formation of lead sulphide in the intestinal tube; the vomited material is white, as a result of the formation of lead chloride, formed by the action of the hydrochloric acid of the gastric juices.

Treatment of Acute Poisoning.—Acute poisoning from lead is treated by washing out the stomach, administering soluble sulphates as a chemical antidote, and bland oils, mucilage, and milk to soothe the inflamed mucous membranes. *Magnesium sulphate* is considered particularly valuable, as it not only precipitates the lead as an insoluble sulphate, but acts as a purge.

Chronic Lead Poisoning.—Chronic lead poisoning, which follows the gradual absorption or ingestion of small quantities of lead compounds, is common in painters; it occasionally follows the drinking of water

which has passed through recently installed lead pipes, from eating preserves kept in glazed crocks, from the use of hair dyes and cosmetics, and from many other sources. The most prominent *symptoms* of lead poisoning are *obstinate constipation*, the stools being clay-colored; abdominal pain, commonly known as *lead colic;* followed or accompanied by bilateral *wrist-drop*, with escape of the short extensors of the thumb, and, in prolonged and severe cases, various other paralyses, coma, and other cerebral symptoms, and by inflammation of the kidneys. A very characteristic symptom is the formation of a *blue line upon the gums* at the junction of the teeth with the soft tissues.

Treatment of Chronic Lead Poisoning.—Chronic poisoning is treated by administering opium to relieve pain, potassium iodide to dissolve and eliminate the lead from the tissues of the body, and by the application of massage and electricity to overcome the paralyses.

Official Salts and Compounds of Lead

Plumbi Acetas (*Lead Acetate*). *Synonym*, Sugar of Lead. *Formula*, $Pb(C_2H_3O_2)_2 + 3H_2O = 376.15$.—Lead acetate occurs in colorless, shining, transparent, monoclinic plates or prisms, or a heavy, white, crystalline mass, or granular crystals. It has a faintly acidulous odor, and a sweetish, astringent, afterward metallic taste. The salt, upon exposure to the air, absorbs carbon dioxide and effloresces. It is *soluble* in 2 parts of water, and in 30 parts of alcohol. Its solution in water is milky in appearance, due no doubt to insoluble carbonate and chlorides.

The salt is obtained by acting upon metallic lead, or lead oxide with acetic acid or vinegar.

Action and Uses.—Lead acetate is an astringent, and is used internally in the treatment of *diarrhœa* and *dysentery*. In solution, it is used locally in the treatment of *specific urethritis, vaginitis, leucorrhœa,* and *dermatitis*. It is employed in making the official Lead Plaster, and Solution of Lead Subacetate.

Dose.—0.06 to 0.2 Gm.; 1 to 3 grains.

Plumbi Iodidum (*Lead Iodide*). *Formula*, $PbI_2 = 457.15$.—A heavy, bright yellow powder, without odor or taste. It is but sparingly soluble in either alcohol or water, but may be readily *dissolved* in a solution of the fixed alkali acetates, of potassium iodide, and of sodium thiosulphate, and in a hot solution of ammonium chloride.

Action and Uses.—When used locally in the form of an ointment, it acts as a stimulant and astringent to *indolent ulcers*.

Plumbi Nitras (*Lead Nitrate*). *Formula*, $Pb(NO_3)_2 = 328.49$.—This salt of lead, ordinarily obtained by adding lead oxide to a mixture of nitric acid and water, heating, filtering, evaporating, and crystallizing, is seen as colorless, transparent, octahedral crystals, or as white, nearly opaque crystals. It is odorless, has a sweetish, astringent,

afterward metallic taste, an acid reaction, is permanent in air, and is *soluble* in 1.8 parts of water, and almost insoluble in alcohol.

Action and Uses.—Lead nitrate is an irritant caustic poison, is never administered internally, but is sometimes used locally as a caustic, and also as a deodorant for *gangrenous* and other *offensive sores.*

Plumbi Oxidum (*Lead Oxide*). *Synonym,* Litharge. *Formula,* PbO = 221.23.—A heavy, yellowish, or reddish-yellow powder, or minute scales, obtained as a secondary product in the process of extracting silver from argentiferous galenas. It is without odor or taste, almost insoluble in water, to which it imparts a faintly alkaline reaction, and is insoluble in alcohol.

Uses.—The oxide is never used internally, but is employed in the manufacture of Lead Plaster.

Liquor Plumbi Subacetatis (*Solution of Lead Subacetate*). *Synonym,* Goulard's Extract.—Solution of lead subacetate is a clear, colorless, odorless, aqueous liquid, having a sweetish, astringent taste and an alkaline reaction, containing not less than 25 per cent. of Lead Subacetate. Upon exposure to air it absorbs carbon dioxide, which causes a white precipitate. The solution is made by boiling lead oxide in an aqueous solution of lead acetate, and filtering.

Action and Uses.—This well-known solution, when used locally, is a valuable local sedative and astringent. It is too strong to be employed without dilution, and is usually dispensed in combination with tincture of opium and water. A popular, though non-official, liquid known as "Lead Water and Laudanum," is made by adding one ounce each of tincture of opium and solution of lead subacetate to enough distilled water to make one pint. This liquid is ordinarily employed as a local application in treating contusions and acute inflammations, such as *bruises, sprains, bunions, orchitis,* and *epididymitis.* It should not be applied to mucous membranes, nor in any case where there is an open wound, as its astringent action upon the tissues retards healing. The solution is not applied as a liniment, but upon soft cloths thoroughly saturated with it, and covered with paraffin paper, rubber tissue, or other protecting dressings, so as to prevent evaporation; a small quantity being occasionally added to keep the cloths constantly saturated.

Incompatibilities.—In addition to the ordinary substances with which the salts of lead are incompatible, solution of subacetate of lead is incompatible with mucilage of acacia, which produces with it a white precipitate.

Uses.—The solution is never used internally, but is used for making the official Diluted Solution of Lead Subacetate, and Cerate of Lead Subacetate.

Liquor Plumbi Subacetatis Dilutus (*Diluted Solution of Subacetate of Lead*). *Synonym,* Lead Water.—An aqueous liquid made by adding 40 Gm. of Solution of Lead Subacetate to enough Distilled Water

to make 1000 Gm. This liquid is rather too weak to be therapeutically valuable.

Ceratum Plumbi Subacetatis (*Cerate of Lead Subacetate*). *Synonym*, Goulard's Cerate.—A soft, ointment-like preparation, made by incorporating 20 Gm. of Solution of Lead Subacetate and 2 Gm. of Camphor with 20 Gm. of Wool-fat, 20 Gm. of Paraffin, and 38 Gm. of White Petrolatum.

Uses.—It is used locally in the treatment of *acute inflammations, sprains,* and *bruises.*

Emplastrum Plumbi (*Lead Plaster*).—Cylindrical rolls of about the consistency of wax, made by adding a solution of lead acetate in water to a warm, aqueous solution of soap with constant stirring. When the precipitate has subsided, the liquid is decanted, and the precipitate is washed with hot water. The mass thus formed is transferred to a warm slab, kneaded to free it from water, rolled into cylindrical forms, and wrapped in paraffin paper.

Uses.—Lead plaster, when melted by the aid of heat and spread upon chamois skin or other fabric, is used as a local sedative and protective dressing. The plaster is also used as a basis in making Mercurial Plaster, Soap Plaster, and Diachylon Ointment.

Unguentum Diachylon (*Diachylon Ointment*).—Prepared by melting 50 Gm. of Lead Plaster, adding to it 49 Gm. of Olive Oil, thoroughly mixing, and, when cool, adding 1 Gm. of Oil of Lavender Flowers.

Used as a dressing for *inflammatory diseases of the skin.*

PODOPHYLLUM—Podophyllum

Synonym, Mandrake Root, May Apple Root. *Family*, Berberidaceæ.

Podophyllum is the fried rhizome of *Podophyllum peltatum*, a perennial herb about 1 foot (0.3 M.) in height, found growing wild in the rich soil of thickets and shady woods in the United States and Canada. The rhizome is of horizontal growth and variable lengths. As found in the market, it is subcylindrical, flattened above, sometimes branched; consisting of joints 2 to 4 inches (50 to 100 mm.) long; the internodes $\frac{1}{12}$ to $\frac{1}{3}$ inch (2 to 8 mm.) thick; externally pale yellowish-brown or dark brown; nearly smooth; nodes annulate, the upper surface being marked by prominent cup-shaped scars; the lower surface with numerous root scars or remaining roots; internally whitish or pale brown, with a circle of wood-bundles and a large pith; odor, of root slight, more pronounced and characteristic in the powder; taste sweetish, disagreeably bitter and acrid. The drug depends for its activity upon a complex resin, commonly called *podophyllin*, which is ordinarily obtained as a precipitate by adding water to a strong, alcoholic tincture of the drug.

Action and Uses.—Podophyllum is an irritant to mucous membranes; in *small* doses, it is a laxative; in *large* doses, a hydragogue purgative;

and in *overdoses* a gastro-intestinal irritant. The drug is peculiar in that as a laxative or purgative it is very slow in its action, and that it stimulates the flow of bile.

Dose.—0.3 to 1 Gm.; 5 to 15 grains.

Official Preparations

Fluidextractum Podophylli (*Fluidextract of Podophyllum*).—Prepared by the usual formula employed in making fluidextracts; the menstruum being in the proportion of 4 parts of alcohol to 1 part of water.

Dose.—0.3 to 1 Cc.; 5 to 15 minims.

Resina Podophylli (*Resin of Podophyllum*).—An amorphous powder, varying in color from grayish-white to pale greenish-yellow, turning darker upon exposure to heat or light; *soluble* in alcohol; practically insoluble in cold water. It has a slight peculiar odor and a faintly bitter taste. The resin is obtained by exhausting podophyllum with alcohol, concentrating the liquid by distilling off the alcohol, pouring the residue into cold water containing 1 per cent. of hydrochloric acid, collecting and drying the precipitate thus formed.

It is a decided irritant to mucous membranes, and is a laxative and purgative in small quantities. It enters into the composition of Vegetable Cathartic Pills, and Pills of Podophyllum, Belladonna, and Capsicum.

Dose.—As a laxative, 0.003 to 0.006 Gm.; $\frac{1}{20}$ to $\frac{1}{10}$ grain. As a purgative, 0.008 to 0.016 Gm.; $\frac{1}{8}$ to $\frac{1}{4}$ grain.

POTASSIUM AND ITS COMPOUNDS

The metal potassium is somewhat softer and more ductile than wax, its newly cut surface is brilliantly silver-white, and is luminous in the dark, but by reason of its strong affinity for oxygen, it quickly tarnishes, and if long exposed to the atmosphere is spontaneously combustible. Being lighter than water, it floats, takes fire, and generates potassium hydroxide, which dissolves in the water. Potassium is kept in liquid hydrocarbons, such as naphtha, or petroleum, which are free from oxygen.

This alkali metal may be obtained by the process of electrolysis from a mixture of powdered charcoal and potassium carbonate, or by subjecting these substances, in a suitable iron container, to intense heat.

While the metal is not officially used in medicine, the salts of potassium are numerous and important therapeutic agents.

Commercial potassium carbonate, commonly known as Potash, and also the impure potassium chloride obtained from mines in Germany, are the principal sources of the various potassium compounds. Potash is usually obtained, by the process of lixiviation and evaporation, from

the ashes of wood or of beet sugar residue. With few exceptions, the salts of potassium are colorless, or of an opaque-white color, and are soluble. The base *potassium*, like that of sodium and ammonium, forms a convenient carrier of acid radicles and elements, being, however, more depressing than either the ammonium or sodium salts.

Official Salts and Compounds

Potassii Acetas (*Potassium Acetate*). *Formula*, $KC_2H_3O_2 = 97.44$.—Potassium acetate occurs as a white powder, or in a crystalline mass of a satin-like luster, usually obtained by adding potassium bicarbonate to diluted acetic acid and carefully evaporating. It is odorless, has a warming, saline taste, deliquesces upon exposure to the air, is *soluble* in 0.4 part of water and 2 parts of alcohol. An aqueous solution changes the color of red litmus paper to blue, but does not affect phenolphthalein test solution. It should be kept in well-stoppered bottles.

Action and Uses.—When taken internally, it is absorbed and circulates in the blood as potassium carbonate, and is eliminated in the urine as the carbonate. In large doses, it is a laxative. The salt is used in the treatment of *rheumatism, hepatic torpor*, as an *alkaline diuretic* and *laxative*.

As may be inferred from its deliquescent nature, potassium acetate should be *administered* in solution.

Incompatibilities.—It is decomposed by mineral acids, and in concentrated solution precipitates quinine sulphate and bisulphate.

Dose.—0.6 to 4 Gm.; 10 to 60 grains.

Potassii Bicarbonas (*Potassium Bicarbonate*). *Formula*, $KHCO_3 = 99.41$.—Potassium bicarbonate occurs in colorless, transparent, monoclinic prisms, or as a colorless, granular powder, made by saturating a solution of potassium carbonate with carbon dioxide and evaporating at a temperature below 71° C. (160° F.). It is odorless, has a saline and slightly alkaline taste, is alkaline to litmus paper, but neutral to phenolphthalein test solution. The salt is permanent in dry air, but becomes moist upon exposure to damp air, is *soluble* in 3 parts of water at the ordinary temperature, and in 1.9 parts of water at 50° C. (122° F.), while in water of a higher temperature it loses carbon dioxide, being reduced to potassium carbonate when boiled. It is almost insoluble in alcohol.

Action and Uses.—The salt is absorbed and eliminated as a carbonate, thereby reducing the normal acidity of the blood, tissue fluids, and urine. It is milder and more acceptable to the stomach than the carbonate, and is used in the treatment of *rheumatism*, as an *alkaline diuretic*, and in making *effervescent drinks*. It is used in preparing Solution of Magnesium Citrate, and in Making Solution of Potassium Citrate.

Being freely soluble in water and deliquescent in moist atmosphere,

it is best *administered* in water, which may be made agreeable by the addition of some non-acid flavoring syrup.

Incompatibilities.—This salt, like other alkaline carbonates and carbonates, effervesces actively, liberating carbon dioxide, when combined with acids, acid salts, and acid solutions. Soluble salts of all the common metals are precipitated from solution by potassium carbonate and bicarbonate, as are many of the alkaloidal salts.

Dose.—0.6 to 4 Gm.; 10 to 60 grains.

Potassii Bitartras (*Potassium Bitartrate*). *Synonym,* Cream of Tartar, Acid Potassium Tartrate. *Formula,* $KHC_4H_4O_6$ = 186.78.—This salt of potassium is seen in colorless, or slightly opaque, rhombic crystals, or, more commonly, as a white, somewhat gritty powder. It is odorless, has a pleasant, somewhat acidulous taste, and an acid reaction. It is less *soluble* than most of the salts of potassium, requiring 200 parts of water at ordinary temperature, and 16.7 parts of boiling water to dissolve it. In alcohol, it is only sparingly soluble. Boric acid and sodium borate are made more soluble in water by the addition of potassium bitartrate.

The salt is ordinarily prepared by purifying *argols,* a deposit occurring in wine casks during the process of fermenting grape-juice.

Action and Uses.—Potassium bitartrate is looked upon as a *diuretic,* which escapes from the kidneys unchanged, and is used in the treatment of *acute* and *chronic inflammation of the kidneys,* and also to overcome *alkalinity of the urine.* Although rarely used as such, it is a *laxative* and *purgative.* It is one of the ingredients in Compound Powder of Jalap. Being permanent in air, potassium bitartrate may be *dispensed* in powders, to be dissolved or mixed in water at the time of taking.

Incompatibilities.—The salt is incompatible with alkali carbonates and bicarbonates, decomposing them with effervescence, and is decomposed by mineral acids.

Dose.—0.6 to 4 Gm.; 10 to 60 grains.

Potassii Bromidum (*Potassium Bromide*). *Formula,* KBr = 118.22.—Potassium bromide occurs as colorless, or white, cubical crystals, or as a granular powder. It is usually made either by double decomposition between ferrous bromide and potassium carbonate, or by treating a solution of potassium hydroxide with bromine and charcoal. It is odorless, has a strongly saline taste, is neutral or scarcely perceptibly alkaline in water, permanent in air, but becomes moist in damp atmosphere, is *soluble* in 1.5 parts of water, 180 parts of alcohol, and is also soluble in glycerin.

Action and Uses.—This salt of potassium does not differ perceptibly in its actions, uses, methods of administering, and incompatibilities from the other bromides. (See Bromides.)

Dose.—0.3 to 4 Gm.; 5 to 60 grains.

Potassii Carbonas (*Potassium Carbonate*). *Synonym,* Sal Tartar. *Formula,* K_2CO_3 = 137.27.—Potassium carbonate is a white, granular

powder, usually made by purifying impure potassium carbonate and granulating. It is odorless, has a strongly alkaline taste, a strongly alkaline reaction, deliquesces in air, and is *soluble* in 0.91 part of water, and insoluble in alcohol.

Action and Uses.—Potassium carbonate, except in diluted solution, is a cauterant to the mucous membrane, and an *irritant* to other tissues. It is an *antacid*, but being harsher and more irritating than potassium bicarbonate, is not as frequently administered as that salt. With the exception of its irritating effect, its action is similar. If *administered* internally, it should be well diluted. In case of *poisoning* by the salt, *weak acids*, such as *vinegar*, *orange juice*, or *lemon juice* should be given to neutralize the alkali, and bland *oils* administered to protect the mucous membrane.

Incompatibilities.—It is decomposed with effervescence by acids, and precipitates from solution many alkaloidal salts, and soluble salts of the metals.

Dose.—0.3 to 0.6 Gm.; 5 to 10 grains.

Potassii Chloras (*Potassium Chlorate*). *Formula*, $KClO_3 = 121.68$.—Potassium chlorate occurs in colorless, lustrous, monoclinic prisms or plates, or as a white, granular powder, usually made either by electrolysis from a solution of calcium hypochlorite, by passing chlorine through a solution of potassium hydroxide, or by double decomposition between solutions of calcium chlorate and potassium chloride.

The salt is odorless, has a cooling, characteristic taste, is neutral in reaction, permanent in air, *soluble* in 16 parts of water, and insoluble in alcohol. When treated with strong hydrochloric acid, the salt evolves chlorine. Potassium chlorate is a most powerful oxidizer, and caution should be observed in handling it, as dangerous explosions are liable to occur when it is heated, or subjected to concussion, or trituration with organic substances, such as cork, tannic acid, and sugar, or with sulphur, antimony sulphide, phosphorus, or other easily oxidizable substances. If, for any reason, it is desired to combine any of these substances in the dry state, each should be powdered separately and mixed gently with a spatula on a pill tile or ointment slab.

Action and Uses.—Internally, potassium chlorate is a circulatory and respiratory depressant, and a renal irritant. In medicinal doses, it is absorbed and reëliminated unchanged by the mucous membrane of the mouth, intestines, and also by the kidneys. In *overdoses*, it is a powerful and rapid-acting poison. In addition to its depressing effect upon the vital centres, it decomposes the blood, changing it to a chocolate color, while the corpuscles are crenated and broken down. This salt of potassium is much abused by the public, who have but a slight understanding of its toxic power. It is useful as a gargle and mouth wash in the treatment of *inflammation of the mouth, gums*, and *pharynx*. Potassium chlorate, hydrochloric acid, and water are used in the preparation of Compound Solution of Chlorine.

Dose.—0.12 to 0.6 Gm.; 2 to 10 grains.

Trochisci Potassii Chloratis (*Troches of Potassium Chlorate*).—Each troche contains about 5 grains (0.3 Gm.) of Potassium Chlorate, prepared with Sugar, Tragacanth, and Water.

Dose.—One tablet.

Potassii Citras (*Potassium Citrate*). *Formula*, $K_3C_6H_5O_7 + H_2O$ = 322.08.—Potassium citrate is seen as transparent, prismatic crystals, or as a white, granular powder, usually made by adding potassium bicarbonate to a solution of citric acid, evaporating to dryness, and granulating. It is odorless, has a cooling, saline taste, an alkaline reaction with litmus paper, does not affect phenolphthalein test solution, is deliquescent when exposed to the air, *soluble* in 0.5 part of water, and sparingly soluble in alcohol.

Action and Uses.—Potassium citrate and all preparations made from it circulate in the blood and are eliminated as potassium carbonate, thereby increasing the alkalinity of the blood, and decreasing the normal acidity of the urine. It is the most agreeable of the potassium salts for internal administration.

This potassium salt is employed in the treatment of *bronchitis, rheumatism, excessive acidity of the urine,* and as a *diuretic* and *diaphoretic* in *acute fevers.*

Being deliquescent, potassium citrate should *not* be *dispensed* in powder. Two other preparations, the Effervescent Potassium Citrate, and the Solution of Potassium Citrate are official, and a third, known as "Neutral Mixture," no longer official, but still extensively employed, is made by neutralizing lemon-juice by the addition of potassium bicarbonate.

Incompatibilities.—Like all salts of weak acids, potassium citrate is decomposed by mineral acids. It renders salicylic, gallic, and benzoic acid more soluble in water, and, in watery solution, decomposes hydrated chloral with the production of chloroform.

Dose.—0.6 to 2 Gm.; 10 to 30 grains.

Potassii Citras Effervescens (*Effervescent Potassium Citrate*).—A white, granular salt, made by intimately mixing dried and powdered Potassium Citrate, Citric Acid, Tartaric Acid, and Sodium Bicarbonate, placing in a suitable oven and *heating* to between 93° and 104° C. (199.4° and 219.5° F.), and *granulating* at a temperature not above 54° C. (129.2° F.). This salt contains about 20 per cent. of potassium citrate. Its actions and uses are the same as those of potassium citrate. It must be kept in well-stoppered bottles.

Dose.—1 to 4 Gm.; 15 to 60 grains.

Liquor Potassii Citratis (*Solution of Potassium Citrate*).—A clear, colorless, slightly acidulous liquid, containing not less than 8 per cent. of anhydrous potassium citrate, with small amounts of carbonic and citric acids. It is made by dissolving Potassium Bicarbonate, 8 Gm., and Citric Acid, 6 Gm., each in 40 Cc. of Water, filtering, and adding through the filter enough water to obtain in each case 50 Cc., and

finally mixing the two solutions, and when effervescence has nearly ceased, transferring the liquid to a bottle. The solution should be *freshly made* when wanted.

The actions and uses of this solution are the same as those of potassium citrate.

Dose.—4 to 30 Cc.; 1 to 8 f℥.

Potassii Cyanidum (*Potassium Cyanide*). *Synonym,* Prussiate of Potash. *Formula,* KCN = 64.70.—Potassium cyanide is obtained in white, opaque, amorphous masses, or as a white, granular powder, prepared either by passing hydrocyanic acid into an alcoholic solution of potassium hydroxide, or by fusing potassium ferrocyanide with potassium carbonate, and after separating the precipitate of metallic iron, pouring the fused mass upon slabs to cool. It is odorless when perfectly dry, but, upon exposure, it deliquesces and exhales the odor of hydrocyanic acid. It is distinctly alkaline in reaction, *soluble* in 2 parts of water at the ordinary temperature, and freely soluble with decomposition in boiling water. Alcohol dissolves it only sparingly. On account of its highly toxic properties the salt should not be tasted, and should be handled with great caution.

Action and Uses.—Potassium cyanide is the most powerfully toxic of all the potassium compounds, being looked upon as a universal depressant poison. Its physiological and poisonous actions are like those of hydrocyanic acid. In medicinal doses, it is occasionally administered to allay irritable *cough,* and to control *vomiting.*

Incompatibilities.—It is decomposed by all acids, and precipitates alkaloidal salts, mercurous compounds, and the soluble salts of lead and copper. It explodes with a sharp report when triturated with potassium chlorate or nitrate, and liberates white fumes when rubbed with hydrated chloral.

Poisoning.—See *Acidum Hydrocyanicum Dilutum.*

Dose.—0.003 to 0.006 Gm.; $\frac{1}{20}$ to $\frac{1}{10}$ grain.

Potassii Dichromas (*Potassium Dichromate*). *Synonym,* Bichromate of Potash. *Formula,* $K_2Cr_2O_7$ = 292.28.—This salt, often known as "bichromate of potash," is seen as large, orange-red, transparent, triclinic prisms, or four-sided tabular crystals. It is odorless, acidulous, having a metallic taste, and an acid reaction. Water *dissolves* 9 parts of the salt, while in alcohol it is insoluble.

It is prepared by acting upon potassium chromate with a weak aqueous solution of sulphuric acid. Strong mineral acids decompose it, with the liberation, in solution, of chromium trioxide.

Action and Uses.—The salt is an irritant caustic. It is sometimes employed locally to destroy *venereal* and *tubercular excrescences,* and rarely internally in the treatment of *syphilis,* and as an astringent. The most frequent use of potassium dichromate is in making *battery fluids, Mueller's Fluid* for preserving anatomical specimens, and also as a source of *chromium trioxide.*

Poisoning.—The symptoms of poisoning are those of a violent gastro-intestinal irritant, pain in the stomach and bowels, vomiting, purging, and profound depression.

The *treatment* of poisoning consists in the use of the *stomach pump*, the administration of *soap*, *magnesia*, or *chalk* as an antidote, *bland oils*, *milk*, or *mucilage* to allay irritability of the mucous membrane, *opiates* to relieve *pain*, and *ammonia*, *strychnine*, and *digitalis* as *stimulants*.

Dose.—0.006 to 0.012 Gm.; $\frac{1}{10}$ to $\frac{1}{5}$ grain.

Potassii et Sodii Tartras (*Potassium and Sodium Tartrate*). *Synonym*, Rochelle Salt. *Formula*, $KNaC_4H_4O_6 + 4H_2O = 280.18$.—Potassium and sodium tartrate is ordinarily seen as a white powder, but is also official as colorless, transparent, rhombic prisms, slightly efflorescent in dry air. It has a cooling, saline taste; odorless; *soluble* in 1.2 parts of water, the aqueous solution being feebly alkaline to litmus paper, but without effect upon solution of phenolphthalein, and almost insoluble in alcohol. The salt may be made by treating a solution of sodium carbonate with potassium bitartrate.

Action and Uses.—Rochelle salt is one of the most popular of saline laxatives. It is the chief ingredient in Seidlitz Powders. Like other alkaline *laxatives* and *purgatives*, sodium and potassium tartrate is best *administered* before breakfast, when the stomach is empty.

Dose.—4 to 16 Gm.; 1 to 4 ℥.

Potassii Ferrocyanidum (*Potassium Ferrocyanide*). *Synonym*, Yellow Prussiate of Potash. *Formula*, $K_4Fe(CN)_6 + 3H_2O = 419.62$.—Potassium ferrocyanide occurs as large, soft, transparent, yellow, four-sided, monoclinic tabular crystals or prisms, usually made by heating together in an iron vessel substances rich in nitrogen, such as hoofs, horn, blood, old carpet, and crude potassium carbonate, lixiviating the mass thus formed, and treating it with freshly precipitated ferrous carbonate. When highly nitrogenous substances are heated with potassium carbonate, impure potassium cyanide is formed, which, when dissolved in water and treated with freshly precipitated ferrous carbonate and then crystallized, forms potassium ferrocyanide.

Potassium ferrocyanide is odorless, has a mild, saline taste, a neutral reaction, is efflorescent upon exposure to air, is *soluble* in 4 parts of water, and insoluble in alcohol.

Action and Uses.—Potassium ferrocyanide, when perfectly pure, is quite inactive, and not poisonous unless the gastric juices are highly acid; in strongly acid gastric juice there is a possibility of hydrogen cyanide being set free by the hydrochloric acid of the gastric juices. The salt is *used* almost exclusively as a *test for ferric salts*, and in making the highly poisonous potassium cyanide and other cyanogen compounds. It is an *antidote* to poisoning by *copper*.

Incompatibilities.—Potassium ferrocyanide is decomposed by mineral acids, hydrogen cyanide being set free. It gives a blue precipitate

with ferric salts, the precipitate being known as *Prussian blue.* It is not used as a medicine except as an antidote to copper.

Potassii Hydroxidum (*Potassium Hydroxide*). *Synonym,* Caustic Potash. *Formula,* KOH = 55.74.—Potassium hydroxide is seen in dry, white, or nearly white flakes, fused masses, or hard, white pencils, containing not less than 85 per cent. of anhydrous potassium hydroxide. It is odorless, or has a faint odor of lye, has a strongly caustic and acrid taste, is intensely alkaline, upon exposure to air absorbs carbon dioxide and moisture, and deliquesces, is *soluble* in 0.4 part of water, and 2 parts of alcohol. Like sodium hydroxide, it destroys organic tissue, saponifies fixed oils, fats, and resins, and neutralizes acids. The hydroxide is obtained by lixiviating wood-ashes, concentrating the solution thus obtained, evaporating to dryness, redissolving and treating with lime, evaporating, fusing, and pouring into moulds to cool.

Action and Uses.—Potassium hydroxide is an irritant caustic, and extremely destructive to animal tissue. In the solid state it may be used as a *caustic,* but must be handled and applied with great *caution.* It is used in making Solution of Potassium Hydroxide.

Liquor Potassii Hydroxidi (*Solution of Potassium Hydroxide*). *Synonym,* Liquor Potassæ.—Solution of potassium hydroxide is a clear, colorless, aqueous liquid, containing about 5 per cent. of anhydrous potassium hydroxide, made by dissolving 6 per cent. of Potassium Hydroxide in distilled water. The solution is free from odor, has a very acrid and caustic taste, and a strongly alkaline reaction. It saponifies fixed oils, fats, and resins.

Action and Uses.—Locally, the solution has a caustic action upon the tissues. When well diluted with water or milk and administered internally in medicinal doses, it is an *antacid,* being used in small doses, and well diluted in water, to overcome *gastric hyperacidity,* and excessive *acidity of the urine.*

Poisonous Action.—If taken internally without dilution, solution of potassium hydroxide exerts its powerful *caustic action* upon the lips, within the mouth, œsophagus, and stomach; death may follow quickly from gastric perforation, or there may develop the usual symptoms of an irritant caustic poison. There is an acrid burning taste in the mouth, throat, œsophagus, and stomach, the voice is hoarse, the tongue and tissues of the mouth corroded and swollen, vomiting of blood and mucus, pain over the abdomen, diarrhœa, and general circulatory depression.

Treatment of Poisoning.—On account of its destructive influence upon the walls of the stomach when a concentrated solution of potassium hydroxide is swallowed, emetics should not be administered, nor the stomach tube used, as these measures are liable to lead to gastric perforation. The alkali should be neutralized with *vegetable acids,* such as *orange-juice, lemon-juice,* a solution of *citric acid,* or *vinegar;* bland *fixed oils,* such as *castor, linseed, olive,* or *almond oils,* and *mucilage*

of acacia should be administered to soothe the inflamed mucous membranes.

Incompatibilities.—Solution of potassium hydroxide is incompatible with acids, acid salts, alkaloidal salts, ammonium salts, the soluble salts of nearly all the metals (except arsenic), hydrated chloral, and phenyl salicylate. When *administered,* it should be freely diluted with milk or water.

Dose.—0.3 to 2 Cc.; 5 to 30 minims.

Potassii Hypophosphis (*Potassium Hypophosphite*). *Formula,* KPH_2O_2 = 103.39.—Potassium hypophosphite occurs in white, opaque, hexagonal plates, a crystalline mass, or as a granular powder, usually made by precipitating calcium hypophosphite with potassium carbonate. Potassium hypophosphite is odorless, has a pungent, saline taste, is neutral or slightly alkaline in reaction; very deliquescent, and *dissolves* in 0.5 part of water, and in 7 parts of alcohol. When heated in a dry state, the salt first loses its moisture, and then evolves spontaneously inflammable hydrogen phosphide gas, which burns with a bright yellow flame.

Caution should be observed in dispensing potassium hypophosphite, as an explosion is liable to occur when it is triturated or heated with nitrates, chlorates, or other oxidizing substances. It must be kept in well-stoppered bottles.

Action and Uses.—This salt, like other hypophosphites, is used in the early stages of *exhausting diseases.* It enters into the composition of Syrup of Hypophosphites, and Compound Syrup of Hypophosphites; and is used in making Diluted Hydriodic Acid. As it is deliquescent, it cannot be given in pills, but must be *dispensed* in solution.

Dose.—0.3 to 1 Gm.; 5 to 15 grains.

Potassii Iodidum (*Potassium Iodide*). *Formula,* KI = 164.76.—Potassium iodide is seen in colorless, transparent, translucent, or opaque-white, cubical crystals, or as a white, granular powder. It has a faint iodine-like odor, a pungent saline, afterward bitter taste, is neutral or slightly alkaline in reaction. The salt is permanent in dry air, but slightly deliquescent in moist air, and *dissolves* in 0.7 part of water, about 12 parts of alcohol, and in 2.5 parts of glycerin.

Potassium iodide may be made by treating an aqueous solution of potassium hydroxide with iodine, evaporating almost to dryness, mixing with powdered charcoal, drying, and subjecting the mass to red heat, lixiviating, concentrating the solution thus obtained, and setting aside to crystallize.

Action and Uses.—The action and uses and incompatibilities of potassium iodide are about the same as the other alkali iodides, except, on account of the potassium base, it is perhaps somewhat more depressing. Being freely soluble in water, it is best *prescribed* in saturated solution, but if kept dry may be dispensed in compressed tablets.

The salt is used in preparing Compound Solution of Iodine, Ointment of Iodine, and Ointment of Potassium Iodide. (See *Iodides.*)

Dose.—0.3 to 2 Gm.; 5 to 30 grains.

Unguentum Potassii Iodidi (*Ointment of Potassium Iodide*).—Made by dissolving 10 Gm. of Potassium Iodide and 0.6 Gm. of Potassium Carbonate in 10 Gm. of Water, and gradually adding 80 Gm. of Benzoinated Lard. The ointment does not keep well, and should be freshly made when wanted.

Ointment of potassium iodide is employed locally as an absorbent and counterirritant over *glandular enlargements.* It does not discolor the skin as does the ointment of iodine.

Potassii Nitras (*Potassium Nitrate*). *Synonym,* Saltpetre. *Formula,* KNO_3 = 100.43.—Potassium nitrate is seen as colorless, transparent, six-sided, rhombic prisms, or as a white, crystalline powder. It is without odor, has a cooling, saline, and pungent taste, is slightly hygroscopic in moist air, *dissolves* in 3.6 parts of water, and is very sparingly soluble in alcohol. At a temperature above 353° C. (667.4° F.) it yields oxygen at first, and then some of its nitrogen. When thrown upon red-hot coals the dried salt deflagrates, and, when triturated with readily oxidizable substances, it detonates. When melted and moulded in balls, it is familiarly known as Sal Prunella. Potassium nitrate is procured either by purifying the crude natural product, by double decomposition between sodium nitrate and potassium chloride, or from nitre beds, made by prolonged contact of earth, wood-ashes, and animal and vegetable refuse.

Action and Uses.—In concentrated form, if swallowed in large quantities, potassium nitrate is an irritant caustic poison, giving rise to violent gastro-enteritis. The salt is rarely used internally as a *diuretic* and *diaphoretic,* but rather extensively in making potassium nitrate paper, and compound powders and cigarettes to be burned and the fumes inhaled to relieve *asthmatic attacks.* The salt is also used in making gunpowder.

Dose.—0.3 to 1 Gm.; 5 to 15 grains.

Potassium Permanganas (*Potassium Permanganate*). *Formula,* $KMnO_4$ = 156.98.—Potassium permanganate occurs in slender, monoclinic prisms, of a dark purple color, almost opaque by transmitted light, and of a blue, metallic luster by reflected light. It is without odor, has a sweetish, afterward astringent taste.

The salt is permanent in air, *soluble* in 15 parts of water, is neutral in reaction, is decomposed by alcohol and other liquids, except fluid petroleum, or other oxygen-free hydrocarbons. When heated, the salt decrepitates, and at 240° C. (464° F.) it yields oxygen, and is reduced to potassium manganate and manganese dioxide. In solution, it is reduced by all oxidizable substances, manganese dioxide being precipitated. Explosions are liable to occur if the salt is triturated

with organic matter. It should be kept in glass-stoppered bottles protected from light.

Potassium permanganate may be made by boiling potassium manganate in distilled water, or by electrolysis of potassium manganate.

Action and Uses.—Potassium permanganate is such a powerful oxidizer that it should not be brought in contact, either in concentrated solution or in dry state, with organic matter, as explosions are liable to occur from a neglect to observe this caution. The salt yields up its oxygen so readily in the presence of organic matter that it is considered an active *disinfectant, antiseptic,* and *deodorizer.* Even the slight organic matter in ordinary water decomposes it, and, therefore, solutions of it should be made in distilled water only. The stains upon the hands or upon fabric may be almost instantly removed by the use of a solution of oxalic acid, hydrogen dioxide, or sodium thiosulphate. Internally, the salt is an irritant to mucous membranes, in *overdoses* giving rise to violent gastritis and enteritis; in medicinal doses, it should be taken with or followed by a full draught of water. It is used internally in the treatment of *amenorrhœa,* and *gastric fermentation;* as a chemical *antidote to morphine* and *phosphorus,* and hypodermically into the tissues surrounding the *wound of a poisonous snake.* In weak solution, it is used locally as a disinfecting irritant in treating *suppurating otitis media, gonorrhœa,* and as a disinfectant and deodorant for *suppurating wounds.* It is particularly valuable as a *deodorant in cancers,* and other foul sloughing sores.

Incompatibilities.—The salt is incompatible with so many substances that it should not be prescribed in combination. It is only reduced slowly in distilled water and petrolatum, therefore, in prescribing the salt, it should be administered either in compressed tablets, coated pills, or pills made with hard petrolatum.

Dose.—0.03 to 0.12 Gm.; ½ to 2 grains.

Potassii Sulphas (*Potassium Sulphate*). *Formula,* $K_2SO_4 = 173.07$.—Potassium sulphate is seen in hard, colorless, transparent, six-sided, rhombic prisms, terminated by pyramids; or as a white powder. The salt is odorless, has a somewhat bitter, saline taste, is permanent in air, *soluble* in 9 parts of water, and insoluble in alcohol. Aqueous solutions of it are neutral to litmus paper.

Potassium sulphate may be prepared by adding sulphuric acid to an aqueous solution of potassium hydroxide, concentrating, and crystallizing; but is obtained commercially by decomposing native potassium chloride with a hot concentrated solution of magnesium sulphate, separating the potassium sulphate from the double chloride of potassium and magnesium thus formed, and crystallizing it.

Action and Uses.—This salt of potassium, in small doses, is a *laxative,* and, in large doses, a *purgative,* but, being more irritating than other laxatives and purgatives, is rarely employed as such. The salt was formally one of the ingredients of Dover's Powder, its hardness making it suitable for reducing the other ingredients to a fine state of pulveriza-

tion during the process of trituration. In the present *Pharmacopœia* it has been replaced by sugar of milk on the formula for preparing Powder of Ipecac and Opium.

Dose.—0.6 to 4 Gm.; 10 to 60 grains.

PRUNUM—Prune

Family, Rosaceæ.

Prunes are official as the partly dried ripe fruit of *Prunus domestica.* The best varieties of prunes found in the market are grown and prepared in southern France, and are known as Prune de St. Julian.

The sarcocarp, or fleshy portion, contains sugar, nitrogenous material, pectin, malic acid, salts, etc. It is *nutritious* and *laxative,* and is used in preparing Confection of Senna.

PRUNUS VIRGINIANA—Wild Cherry

Family, Rosaceæ.

The Wild Cherry tree, *Prunus serotina* or *Prunus virginiana,* from which the bark is collected in the autumn and carefully dried, is the common wild cherry which grows throughout North America and Canada. The bark is usually seen in transversely curved pieces, from about 1 to 2 inches (25 to 50 mm.) long, and about $\frac{1}{12}$ to $\frac{1}{5}$ inch (2 to 5 mm.) thick; its outer surface is pale-green, or greenish-brown; its inner surface, light brown. When macerated in water, it has the odor of bitter almond; its taste is agreeably bitter, astringent, and aromatic. Bark from large and from very small branches should be rejected.

The drug contains a glucoside *amygdalin,* and a ferment *emulsin,* which, in the presence of water, react upon each other, forming *benzaldehyde* and *hydrocyanic acid,* both of which are volatilized by heat, and therefore the use of heat should be avoided in making any of the preparations containing wild cherry bark. In addition to the above-named principles, the drug contains a bitter principle, tannin, gallic acid, and resin.

Action and Uses.—The fluidextract of wild cherry is used as a *tonic* to stimulate the appetite and promote digestion, the syrup of wild cherry as a *vehicle* and *mild sedative* to allay *cough,* and the infusion as a tonic and mild sedative.

Dose.—2 to 4 Gm.; $\frac{1}{2}$ to 1 ℥, in infusion.

Official Preparations

Fluidextractum Pruni Virginianæ (*Fluidextract of Wild Cherry*).—This fluidextract is made by percolating ground Wild Cherry with a menstruum of Glycerin, Alcohol, and Water, and, for the reason stated above, without the aid of heat.

Dose.—2 to 4 Cc.; $\frac{1}{2}$ to 1 f℥.

Infusum Pruni Virginianæ (*Infusion of Wild Cherry*).—This infusion is made by percolating 40 Gm. ground Wild Cherry with a menstruum of 50 Cc. of Glycerin, and Cold Water enough to make 1000 Cc.

Dose.—15 to 30 Cc.; 4 to 8 f℥.

Syrupus Pruni Virginianæ (*Syrup of Wild Cherry*).—Made by dissolving Sugar in a specially prepared strong infusion of Wild Cherry by agitation without heat.

Dose.—2 to 8 Cc.; ½ to 2 f℥.

PYRETHRUM—Pyrethrum

Synonym, Pellitory. *Family*, Compositæ.

Pyrethrum is the dried root of *Anacyclus Pyrethrum*, a plant much resembling chamomile, growing mostly along the Mediterranean coast. The supply of this country comes almost entirely from Algiers.

The root, as seen in the shops, is about 2 to 4 inches (50 to 100 mm.) long, ⅛ to ⅘ inch (3 to 20 mm.) in diameter, longitudinally wrinkled and grayish-brown externally, and whitish within. The bark adheres closely to the light yellow, porous wood. The drug has a distinct odor, and, when chewed, has a pungent, acrid taste, which promotes the prompt and free flow of saliva. The drug contains an acrid resinous substance known as *pyrethrin*, and an alkaloid *pyrethrine*.

Action and Uses.—Pyrethrum is a distinct irritant to the mucous membrane. If chewed, it produces a burning sensation within the mouth and fauces, and promotes the profuse flow of saliva. A minute quantity of the powder snuffed or inhaled into the nostrils causes a burning sensation and violent sneezing; if swallowed, it gives rise to a burning sensation over the epigastrium and abdomen, and is liable to induce vomiting and purging. In full quantities, it has been known to give rise to violent gastro-enteritis, followed by death. The drug is unfit for administration, except to be chewed and *not* swallowed. In this way, it is rather infrequently employed to relieve *pain in a decayed tooth*. The tincture is occasionally used as one of the ingredients of tooth and mouth washes.

Dose.—To be chewed, but not swallowed.

Official Preparation

Tinctura Pyrethri (*Tincture of Pyrethrum*).—Made by percolating 20 Gm. of the powdered Pyrethrum drug with Alcohol to make 100 Cc. of tincture.

Uses.—Employed in mouth and tooth washes.

PYROGALLOL—Pyrogallol

Synonym, Pyrogallic Acid. *Formula*, $C_6H_6O_3$ = 125.10.

This triatomic phenol, with the structural formulæ, [$C_6H_3(OH)_3$-1 : 2 : 3], is seen as light, white, flat, or needle-shaped crystals, and is made by careful sublimation from gallic acid. Upon exposure to air and light, it changes to a grayish color; it is *soluble* in 1.6 parts of water, the solution at first being colorless and neutral, but upon exposure to the air acquires a brown color, and an acid reaction, due to the absorption of oxygen. It is freely soluble in alcohol and ether, and may be mixed with petrolatum and hydrated wool-fat.

Incompatibilities.—The substance has a powerful affinity for oxygen, and is instantly changed by chlorine, iodine, and bromine, and in aqueous solutions (1 in 10) reduces the salts of gold, silver, and mercury.

Action and Uses.—The sole use of pyrogallol in medicine is as a stimulating antiseptic and parasiticide in treating *psoriasis*, and *parasitic diseases of the skin*. On account of certain disagreeable features and dangers associated with its use, care must be observed whenever it is employed. It stains the skin and clothing a deep brown color, and not infrequently gives rise to dermatitis, or it may become absorbed and produce vomiting, purging, cyanosis, jaundice, collapse, and renal irritation, and even death. The same toxic effects are seen if the chemical is taken internally.

PYROXYLINUM—Pyroxylin

Synonym, Gun Cotton.

Pyroxylin is an almost white, or yellowish-white, matted mass of filaments, resembling raw cotton in appearance, made by the action of a mixture of nitric and sulphuric acid on cotton. Chemically, it is a mixture of cellulose di-, tri-, tetra-, and penta-nitrates, mostly cellulose tetranitrate.

The substance is highly inflammable, explosive, although less so than cellulose trinitrate; it slowly decomposes in air-tight bottles exposed to light, and *dissolves* in 25 parts of a mixture of 3 volumes of ether and 1 volume of alcohol, and also in acetone and glacial acetic acid. Solutions of the substance are precipitated by water.

Uses.—The sole use of pyroxylin in medicine is in making Collodions. (See *Collodion*, Part III.)

QUASSIA—Quassia

Family, Simarubaceæ.

Quassia appears in the market in chips, raspings, or billets of wood obtained from two nearly related species of quassia trees, *Picrasma excelsa*, known commercially as Jamaica Quassia, and *Quassia amara*,

known as Surinam Quassia. The former, as its name suggests, is from a tall tree growing mostly in Jamaica; the latter, from a small branching tree or shrub native to Surinam, but also growing in Brazil and the other tropical countries.

The wood is usually shipped to this country in billets, but in the shops is usually seen in chips or raspings of a yellowish-white or pale yellow color. Surinam being of a deeper color than Jamaica Quassia. Its taste, which is intensely bitter, is imparted to both water and alcohol.

The drug owes its properties to an intensely bitter, crystallizable principle known as *quassin*. Unlike most bitter tonics, quassia does not contain tannin.

Action and Uses.—Quassia is a *bitter tonic* used to stimulate the appetite and promote both gastric and intestinal digestion. As the drug contains no tannin, it may be combined with ferric salts or solutions. Preparations of quassia are often administered by the mouth and by rectal irrigation to free the colon and rectum of *thread worms*.

Dose.—0.3 to 0.6 Gm.; 5 to 10 grains, in infusion.

Official Preparations

Extractum Quassiæ (*Extract of Quassia*).—A dry, *powdered extract* prepared from Quassia; menstruum, cold water.

Dose.—0.06 to 0.2 Gm.; 1 to 3 grains.

Fluidextractum Quassiæ (*Fluidextract of Quassia*).—Menstruum, Alcohol, 1 part; Water, 2 parts.

Dose.—0.3 to 0.6 Cc.; 5 to 10 minims.

Tinctura Quassiæ (*Tincture of Quassia*).—Made by percolating 20 Gm. of Quassia with a menstruum of Alcohol, 35 parts, and Water, 65 parts, to obtain 100 Cc. of tincture.

Dose.—2 to 4 Cc.; ½ to 1 f℥.

QUERCUS—White Oak

Family, Cupuliferæ.

The dried bark of the common White Oak, *Quercus alba,* which grows most abundantly in the Middle States, but found also throughout the whole United States. In its official form, the bark is that collected from the trunks and branches of trees ten to twenty years of age, and deprived of its epidermis or periderm. It is light brown externally, the color deepening with age, has a distinct odor and a strongly astringent taste. When chewed, it does not tinge the saliva yellow. The bark depends for its medicinal properties upon *tannic acid,* which it contains in large quantities.

Action and Uses.—White Oak bark is a distinct astringent, and preparations made from it are popular both as household remedies and in regular medical practice. Internally, it is used in the treatment of

diarrhœa, and locally in *leucorrhœa*, *hemorrhoids*, and for controlling *oozing hemorrhages*.

Incompatibilities.—See *Acidum Tannicum*.

Dose.—0.6 to 2 Gm.; 10 to 30 grains, in infusion.

Official Preparation

Fluidextractum Quercus (*Fluidextract of Quercus*).—Made with a menstruum of diluted alcohol, with 10 parts of glycerin.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

QUILLAJA—Quillaja

Synonym, Soap Bark. *Family*, Rosaceæ.

Quillaja is the bark of *Quillaja Saponaria*, a tree native to Peru and Chile, deprived of its periderm, outer bark, and dried. As seen in the shops, the bark is in flat pieces $\frac{1}{6}$ to $\frac{1}{3}$ inch (4 to 8 mm.) thick, or in small chips, brownish-white externally, and yellowish-white within. It has an acrid taste, and its powder is strongly sternutatory. The drug owes its medicinal properties to *saponin*, a glucoside, which, when agitated with water, forms a froth, like soapsuds.

Action and Uses.—By reason of its irritant and depressant properties, quillaja is rarely used internally, but is occasionally employed as a stimulating *expectorant* in the later stages of *bronchitis*. Preparations of the bark are used in *mouth* and *tooth washes*, occasionally in stimulating liniments, but, more frequently, for the purpose of cleaning silks.

Official Preparations

Fluidextractum Quillajæ (*Fluidextract of Quillaja*).—Made with a menstruum of diluted alcohol.

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

Tinctura Quillajæ (*Tincture of Quillaja*).—Prepared by boiling 20 Gm. of Quillaja in 80 Cc. of Water, evaporating to 60 Cc., adding 35 Cc. of Alcohol, and then enough Water to make 100 Cc. of tincture.

Dose.—2 to 4 Cc.; 15 to 60 minims.

QUININA—Quinine

See *Cinchona*.

RESINA—Rosin

Synonym, Colophony.

Rosin, or yellow rosin, as it is occasionally called, is the translucent, amber-colored residue left after distilling off the volatile oils from

turpentine. It is usually seen in brittle fragments covered with a yellowish dust. The substance is easily pulverizable, has a faint terebinthinate odor and taste, and burns with a dense yellowish smoke. It is *insoluble* in water, but *dissolves* in alcohol, ether, oils, acetic acid, carbon disulphide, and in solutions of potassium or sodium hydroxide.

Action and Uses.—Rosin is infrequently used as a stimulating *expectorant*, and *diuretic*, but enters into the manufacture of many of the official plasters, and also some of the official cerates to increase their adhesiveness. It retards the oxidation of fats, and is, therefore, looked upon as a preservative of ointments. Locally, when combined with fats, it forms a protective dressing and also hastens maturation of *furuncles* and other *small abscesses*.

Dose.—0.06 to 0.3 Gm.; 1 to 5 grains.

Official Preparations

Ceratum Resinæ (*Rosin Cerate*). *Synonym*, Basilicon Ointment.—A cerate containing 35 per cent. of Rosin, 15 per cent. of Yellow Wax, and 50 per cent. of Lard. Used locally to hasten the *maturation of boils* or other small *abscesses*, and as a dressing for *burns* and *ulcers*. Also useful as a *pill excipient* for oxidizable substances, such as potassium permanganate.

Ceratum Resinæ Compositum (*Compound Rosin Cerate*). *Synonym*, Deshler's Salve.—A cerate containing 25.5 per cent. of Rosin, 25 per cent. of Yellow Wax, 30 per cent. of Prepared Suet, 11.5 per cent. of Turpentine, and 13.5 per cent. of Linseed Oil. On account of the presence of linseed oil, it becomes tough or rubber-like when long kept, which adds to its value as an adhesive protective dressing. Its uses are the same as those of rosin cerate.

RESINA JALAPÆ—Resin of Jalap

See *Jalap*.

RESINA PODOPHYLLI—Resin of Podophyllum

See *Podophyllum*.

RESINA SCAMMONII—Resin of Scammony

See *Scammony*.

RESORCINOL—Resorcinol

Formula, $C_6H_6O_2 = 109.22$.

Resorcinol is a diatomic phenol usually obtained by fusing sodium benzene disulphonate with sodium hydroxide to form sodium resorcin, boiling thoroughly, extracting the tar-like residue with ether, and

distilling to dryness. Resorcinol thus obtained may be sublimed or recrystallized from water to obtain the pure product. Resorcinol appears in colorless, needle-shaped crystals, having a peculiar odor, and a sweetish, afterward bitter taste. Upon exposure to light and air, it acquires a pinkish tint, and should, therefore, be kept in amber-colored bottles. The chemical is *soluble* in 0.5 part of water, still more freely soluble in alcohol, and also readily soluble in ether and glycerin. From 109° to 111° C. (228.2° to 231.8° F.) it melts, and at a higher temperature volatilizes.

Action and Uses.—In concentrated solution resorcinol is an irritant to the skin and mucous membrane, but, in diluted solution, it has but slight effect upon these tissues. Internally in *toxic doses*, it gives rise to symptoms resembling those arising from phenol, except in a much milder degree and minus the cauterizing effect. There is vertigo, dimness of vision, tremors, accelerated and irregular respiration, rapid, irregular, and weak pulse, and, in lethal doses, unconsciousness, epileptiform and tetanic convulsions. The drug is employed as an *antiseptic*, *parasiticide*, *local anesthetic*, *antispasmodic*, and *antipyretic*. Internally, it is administered in cases of *gastric ulcer*, *gastralgia*, *gastric catarrh*, and *gastro-intestinal fermentation*, and is applied locally in ointment or solution in the treatment of *eczema*, *psoriasis*, *acne*, and *parasitic diseases of the skin*. In diluted solution, it is also used as a spray in the treatment of *whooping cough*, and *catarrhal conditions of the throat and nose*.

To avoid grittiness when preparing ointments containing resorcinol, the crystals should first be liquefied by the addition of a few drops of water, alcohol, or glycerin before being rubbed down with the ointment base.

Incompatibilities.—In solution, resorcinol, in the presence of alkalies, becomes red; of ferric salts or solution, violet in color; of spirit of nitrous ether, or acidified nitrites, dark red. It precipitates the salts of quinine, and liquefies if triturated dry with acetanilide, antipyrine, camphor, menthol, naphthalene, and phenol.

Dose.—0.06 to 0.2 Gm.; 1 to 3 grains. Locally in solutions or ointments of from 2 to 5 per cent.

RHAMNUS PURSHIANA—Cascara Sagrada

Family, Rhamnaceæ.

The bark of *Rhamnus Purshiana*, a small tree growing in Northern Idaho and Northern California, is collected and dried at least one year before being used. The bark is usually seen in quills or curved pieces $\frac{1}{25}$ to $\frac{1}{4}$ inch (1 to 6 mm.) thick; reddish-brown externally, yellowish or light brown internally, becoming dark with age, and reddened by alkalies. It has a bitter and slightly acrid taste. It contains a crystalline glucoside known as *purshian*, or *cascarin*, a fixed oil, a

volatile oil, tannin, and three *resins*. The fresh bark also contains a *ferment* which gives rise to a good deal of griping, therefore, only the old dried bark should be employed. The laxative effect of cascara is due to its resins, which are more or less soluble in alkalies.

Preparations of the bark when treated for a long time with alkalies are rendered less bitter; advantage is taken of this fact in making the tasteless and aromatic preparations.

Action and Uses.—Cascara Sagrada is a laxative and a tonic to the bowel, and is valuable for overcoming *chronic* or *habitual constipation*. The drug should never be administered in full doses as a purgative, as under these circumstances it gives rise to considerable griping, but should be employed only in laxative doses. Acids should not be combined with the aromatic or tasteless preparations of cascara, as they almost instantly redevelop their bitter taste.

Official Preparations

Extractum Rhamni Purshianæ (*Extract of Cascara Sagrada*).—A *powdered extract* of Cascara Sagrada, four times the strength of the crude drug, containing a small quantity of powdered Glycyrrhiza.

Dose.—0.2 to 0.5 Gm.; 3 to 7 grains.

Fluidextractum Rhamni Purshianæ (*Fluidextract of Cascara Sagrada*).—Menstruum, 2 parts of alcohol and 1 part of water. Its taste is persistently and disagreeably bitter.

Dose.—1 to 2 Cc.; 15 to 30 minims.

Fluidextractum Rhamni Purshianæ Aromaticum (*Aromatic Fluidextract of Cascara Sagrada*).—An aromatic fluidextract of Cascara Sagrada, prepared so as to be rendered less bitter by the use of Magnesium Oxide, and sweet and aromatic by Glycyrrhiza, Glycerin, and Compound Spirit of Orange. It is of the same strength in Cascara Sagrada as the non-aromatic fluidextract. Its taste is sweet and agreeably aromatic.

Dose.—1 to 2 Cc.; 15 to 30 minims.

RHEUM—Rhubarb

Family, Polygonaceæ.

Rhubarb is the rhizome, deprived of most of its bark and carefully dried, of *Rheum officinale*, *Rheum palmatum*, or other species of *Rheum* grown in China and Tibet. The plant from which the drug is obtained resembles in many particulars the ordinary garden rhubarb, but is much larger. The rhizome, as found in the shops, is seen in subcylindrical, conical, plano-convex, or other irregular shaped pieces, some having large perforations or holes through it. It is brownish in color, and, upon close inspection, is seen to be mottled with alternating striæ of light brown parenchyma cells and dark brown medullary rays; occasionally with reddish-brown cork patches and small radiate scars of fibrovas-

cular tissue. When broken, it is somewhat granular, and has a peculiar marbled appearance. It has a bitter, astringent taste, and, owing to crystals of calcium oxalate contained in it, is gritty when chewed. The powder is of a bright orange color, becoming red when triturated with alkalies.

Rhubarb is not dependent upon any one principle for its medicinal properties, but upon the natural combination of a number of them. It contains at least three *resins*, known as *erythroretin*, *phleoretin*, and *aporetin*, and an astringent principle known as *rheotannic acid*, and also *chrysophanic acid*, *emodin*, *rhein*, and crystals of *calcium oxalate*.

Action and Uses.—Rhubarb possesses the peculiar property of being both a *laxative* and *astringent*, and, when administered in medicinal doses, produces soft stools rarely accompanied by griping, but usually followed by constipation. In addition to its use as a laxative, the drug is looked upon as of value in the treatment of *gastric* and *intestinal catarrh*. The laxative principle and coloring matter of the drug is eliminated by all the secretions, giving to the urine a brownish-yellow color. If administered to a mother nursing an infant at the breast, it is likely to purge the child. The drug yields its medicinal virtues to both water and alcohol, but is injured by boiling. Sodium bicarbonate, potassium carbonate, and magnesium oxide render the resins of rhubarb more soluble, and enter into the formulæ of several of its official preparations.

Dose.—0.6 to 2 Gm.; 10 to 30 grains.

Official Preparations

Extractum Rhei (*Extract of Rhubarb*).—Prepared by evaporating the Fluidextract of Rhubarb to a *pilular* consistency.

Dose.—0.2 to 0.6 Gm.; 3 to 10 grains.

Fluidextractum Rhei (*Fluidextract of Rhubarb*).—Made with a menstruum of 4 parts of alcohol and 1 part of water.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

Mistura Rhei et Sodæ (*Mixture of Rhubarb and Soda.*—An aqueous liquid preparation containing Fluidextract of Rhubarb, 1.5 Cc.; Sodium Bicarbonate, 3.5 Gm; Fluidextract of Ipecac, 0.3 Cc.; Glycerin, 35 Cc.; Spirit of Peppermint, 3.5 Cc.; and Water enough to make 100 Cc.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Pilulæ Rhei Compositæ (*Compound Pills of Rhubarb*).—Each pill contains 0.13 Gm. (about 2 grains) of Rhubarb, 0.1 Gm. (about $1\frac{1}{2}$ grains) of Purified Aloes, 0.06 Gm. (about 1 grain) of Myrrh, and 0.005 Gm. (about $\frac{1}{10}$ grain) of oil of Peppermint.

Dose.—1 to 3 pills.

Pulvis Rhei Compositus (*Compound Powder of Rhubarb*).—Made by mixing together 25 Gm. of powdered Rhubarb, 65 Gm. of Magnesium Oxide, and 10 Gm. of Ginger.

Dose.—2 to 4 Gm.; 30 to 60 grains.

Syrupus Rhei (*Syrup of Rhubarb*).—Prepared by mixing 10 Cc. of Fluidextract of Rhubarb with 0.4 Cc. of Spirit of Cinnamon and 1 Gm. of Potassium Carbonate, dissolved in 50 Cc. of Water, and enough Syrup to make 100 Cc.

Dose.—8 to 16 Cc.; 2 to 4 f℥.

Syrupus Rhei Aromaticus (*Aromatic Syrup of Rhubarb*).—Prepared by dissolving 0.1 Gm. of Potassium Carbonate, in 15 Cc. of Aromatic Tincture of Rhubarb, and adding 85 Cc. of Syrup.

Dose.—8 to 16 Cc.; 2 to 4 f℥.

Tinctura Rhei (*Tincture of Rhubarb*).—Made by percolating 20 Gm. of Rhubarb and 4 Gm. of Cardamom with a menstruum of 50 parts of Alcohol, 40 parts of Water, and 10 parts of Glycerin, to make 100 Cc.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Tinctura Rhei Aromatica (*Aromatic Tincture of Rhubarb*).—Made by percolating 20 Gm. of Rhubarb with 4 Gm. of Saigon Cinnamon, 4 Gm. of Cloves, 2 Gm. of Nutmeg, with a menstruum of 50 parts of Alcohol, 40 parts of Water, and 10 parts of Glycerin to make 100 Cc.

Dose.—4 to 8 Cc. ; 1 to 2 f℥.

RHUS GLABRA—Rhus Glabra

Synonym, Sumach. *Family,* Anacardiaceæ.

Rhus Glabra is the dried fruit of *Rhus glabra,* a shrub growing abundantly throughout the United States. The crimson fruit or berries are spherical, somewhat flattened, about $\frac{1}{8}$ to $\frac{1}{6}$ inch (3 to 4 mm.) in diameter, covered with matted hairy glands, and enclose a single seed. Its taste is sour and astringent, and not unpleasant. The sour taste is due to *malic acid,* which exists in the pubescence covering the berry. In addition, it contains *tannic* and *gallic acid,* and red coloring matter.

Action and Uses.—Rhus Glabra is astringent in its properties, and preparations made from it are used in gargles in the treatment of *tonsillitis* and *pharyngitis,* and also internally in *incontinence of urine.*

Its preparations are incompatible with ferric salts.

Official Preparation

Fluidextractum Rhois Glabræ (*Fluidextract of Rhus Glabra*).—Made by percolating 100 Gm. of Rhus Glabra with 100 Cc. of a menstruum, composed of 10 Cc. of Glycerin and 90 Cc. of Diluted Alcohol, and finishing the process of exhaustion with Diluted Alcohol. This fluidextract, although precipitated by water, is often prescribed in that liquid to form mixtures.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

ROSA GALLICA—Red Rose

Family, Rosaceæ.

The shrub *Rosa Gallica,* bearing the flower from which the petals are collected and dried, is a native of southern Europe, but is cultivated in gardens in North America. The flowers are large, with widely separated rich crimson petals. The petals are less numerous, and the flower less fragrant than Rosa Centifolia. The petals should be collected before the flower expands, and carefully dried. As seen in the shops, red rose is in small, unexpanded cones or buds, having a characteristic odor and a slightly bitter, acidulous, and astringent taste. Its astringent properties are due to *quercitrin, tannic* and *gallic acids.* An infusion made from the drug is of a pale reddish color, which becomes bright red upon the addition of sulphuric acid. Oil of rose is not obtained from Rosa Gallica, but from Rosa Damascena. (See *Oleum Rosæ.*)

Action and Uses.—Red rose is mildly *astringent* and *tonic* in its action, and preparations made from it are chiefly used as vehicles. It is incompatible with ferric salts.

Official Preparations

Confectio Rosæ (*Confection of Rose*).—A uniform mass made by incorporating 64 Gm. of Sugar and 12 Gm. of Clarified Honey with 8 Gm. of powdered Red Rose rubbed with 16 Cc. of Stronger Rose Water.

This confection forms a convenient mass or vehicle for administering other astringent vegetable drugs.

Dose.—Any quantity.

Fluidextractum Rosæ (*Fluidextract of Rose*).—Made by partially exhausting 100 Gm. of Red Rose with 100 Cc. of a menstruum of Diluted Alcohol, 90 Cc.; Glycerin, 10 Cc.; and finishing the process with Diluted Alcohol.

Dose.—2 to 4 Cc.; 30 to 60 minims.

Mel Rosæ (*Honey of Rose*).—Made by mixing 12 Cc. of Fluidextract of Rose with enough Clarified Honey to make 100 Cc.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Syrupus Rosæ (*Syrup of Rose*).—Prepared by dissolving 75 Gm. of Sugar in a mixture of 12.5 Cc. of Fluidextract of Rose, 1 Cc. of Diluted Sulphuric Acid, and Water to make 100 Cc. of syrup.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

RUBUS—Rubus

Synonym, Blackberry Root Bark. *Family,* Rosaceæ.

Rubus is the dried bark of several species of blackberry growing wild. The *U. S. Pharmacopœia* recognizes the bark obtained from *Rubus villosus,* which is found growing in fields and thickets from Maine to

Florida, and as far west as Arkansas, from *Rubus nigrobaccus*, common throughout the whole of the eastern United States, and from *Rubus cuneifolius*, which grows in sandy soil throughout the whole United States. It is probable that many other varieties furnish the drug found in the market. The bark is seen in long, tough, flexible, quills; outer surface reddish-brown, dark grayish-brown, or brownish-black; inner surface yellow, or pale brownish. Its taste is strongly astringent and bitter. The medicinal properties of rubus depend upon *tannin*, of which it contains a considerable quantity. It yields its virtues to water and alcohol.

Action and Uses.—Preparations made from rubus are distinctly astringent in their action, and are used in the treatment of *diarrhœa*, *incontinence of urine*, and as a gargle in *tonsillitis* and *pharyngitis*.

Dose.—2 to 4 Gm.; 1 to 2 ʒ, in decoction.

Official Preparations

Fluidextractum Rubi (*Fluidextract of Rubus*).—Menstruum, diluted alcohol.

Dose.—2 to 4 Cc.; ½ to 1 f ʒ.

Syrupus Rubi (*Syrup of Rubus*).—Prepared by mixing 25 Cc. of Fluidextract of Rubus with 75 Cc. of Syrup.

Dose.—4 to 8 Cc.; 1 to 2 f ʒ.

SABAL—Sabal

Synonym, Saw Palmetto. *Family*, Palmæ.

The partially dried fruit of the common saw palmetto, *Serenoa serrulata*, which grows wild and abundantly along the Atlantic Coast from South Carolina to Florida. The fruit, which grows in clusters, is a dry, one-sided, brownish-black drupe (stone seeded). It is oblong, ovoid, wrinkled, about ⅖ to 1 inch (10 to 25 mm.) long, ⅖ to ⅗ inch (10 to 15 mm.) in diameter, with a thin green fleshy portion, and a hard chocolate-colored seed. Its taste is sweetish, acrid, oily, and not agreeable; its odor is aromatic. Upon pressure, the fruit yields a dark or brownish-yellow *oil*, upon which it depends for its medicinal properties.

Action and Uses.—The fruit and its oil act as a stimulant to the mucous membranes of the respiratory and genito-urinary tracts, and is used in subacute catarrhal affections of these tissues. It is administered in treating *subacute* and *chronic bronchitis*, *cystitis*, and *urethritis*.

Dose.—0.6 to 2 Gm.; 10 to 30 grains.

SABINA—Savin

Family, Coniferæ.

Savin is the tops of *Juniperus Sabina*, an evergreen shrub native to southern Europe, but also found growing wild in Canada and in the

United States along the border, from Maine to Wisconsin. The tops are collected in the spring, and, when fresh, are quite fragrant and of a deep green color, but upon long keeping they fade in color and lose some of their fragrance. In the shops the tops are seen in short, thick branches, bearing short, scale-like, green leaves, which adhere closely to the branches. Its terebinthinate odor is quite similar to that of the cedars in general; its taste is disagreeable, resinous, and bitter. It is probable that much of the savin in the market is adulterated by the tops of the common red cedar, which it closely resembles.

The drug contains a turpentine-like *oil, resin,* and *tannin.* The oil is its most active ingredient, and is official.

Action and Uses.—The drug and its oil are irritants, and, when taken internally, are liable to produce vomiting, purging, and bloody urine. It has been administered with asserted success in *menorrhagia* dependent upon uterine relaxation, but on account of its irritant properties it should be used with caution. In the hands of quacks and abortionists, deaths have been caused by the use of this drug or its oil.

Official Preparations.

Fluidextractum Sabinæ (*Fluidextract of Savin*).—Made with a menstruum of alcohol.

Dose.—1 to 2 Cc.; 10 to 30 minims.

Oleum Sabinæ (*Oil of Savin*).—A colorless, or yellowish, volatile oil obtained by distillation from the fresh tops of savin.

Dose.—0.3 to 1 Cc.; 5 to 15 minims.

SACCHARUM—Sugar

Family, Gramineæ, also Chenopodiaceæ. *Formula,* $C_{12}H_{22}O_{11} = 339.6$.

Sugar obtained from sugar cane, sorghum cane, and from one or more varieties of beets. In its purest form it is in hard, white, crystalline granules, free from odor, and permanent in air. It is *soluble* in about 0.4 part of water at the ordinary temperature; 0.2 part of boiling water, and in about 137 parts of alcohol, and 28 parts of boiling alcohol, but is insoluble in ether and chloroform. Aqueous and alcoholic solutions should be neutral in reaction, clear and transparent, should not deposit a sediment when kept in well-filled closed bottles, nor should they respond to the test for glucose. Cane sugar is dextrorotatory, and does not ferment itself, nor does it affect an alkaline solution of cupric sulphate solution, but when fermented by yeast or boiled with diluted acids it is converted into invert sugar (glucose and levulose), which is levorotatory, and reduces a boiling alkaline solution of cupric sulphate.

A heated, concentrated solution of sugar in water, if treated with strong alcohol, forms large white, semi-transparent crystals of hydrated

sugar, known as *rock candy*. When heated between 204.4° and 215.5° C. (400° to 420° F.), sugar loses two molecules of water, and is converted into a black, almost tasteless, porous mass, having a high luster, known as *caramel*. Sugar increases the solubility of calcium hydroxide in water, forms combinations with fixed and volatile oils, and renders them to a certain extent miscible with water; in solution, it retards the oxidation of compounds of iron. Oxidizing agents act energetically upon sugar, which is a strong reducing agent. If triturated with active oxidizing agents, such as potassium chlorate, potassium permanganate, or silver oxide, explosions are likely to occur.

Strong sulphuric acid chars sugar, strong nitric acid and heat convert it into oxalic and weak sulphuric acid, and heat converts it into invert sugar.

Action and Uses.—The nutritive value of this carbohydrate is nearly equal to that of starch, but, as it contains no nitrogen, is incapable alone of sustaining life. It is digested with somewhat greater difficulty than most carbohydrates, and, if taken in excess, is apt to lead to fermentative indigestion. Although not altered by the ptyalin nor amylopsin, it is hydrolyzed by the digestive juices before it is absorbed and passed into the blood as dextrose and levulose. As dextrose is carried to the liver by the portal veins, a part of it is dehydrated and stored as glycogen, and a large portion passes the liver and is distributed to the tissues of the body, where it is in part stored as fat and in part oxidized to give energy. When glucose is in the blood in excess of its normal quantity of from 0.1 to 0.2 per cent., it causes glycosuria.

Sugar is used in making the various medicinal and aromatic *syrupus*, *troches*, *masses*, *confections*, *saccharures*, *oleo-saccharures*, and aromatic sugar, all employed to form convenient, agreeable, and efficient methods of administering many medicinal substances. Syrup is not only an agreeable vehicle, but in many instances prevents chemical changes in mixtures, and also prevents putrefaction, but not fermentation.

Saccharures are made by saturating sugar with tinctures, drying and powdering.

Aromatic sugars are made by pouring alcoholic tincture of spices over granulated sugar and drying by exposure to the air.

Oleo-saccharures are made by incorporating volatile oils with sugar in the proportion of one drop of oil to thirty grains of sugar.

SACCHARUM LACTIS—Sugar of Milk

Formula, $C_{12}H_{22}O_{11} + H_2O = 357.48$.

Sugar of milk is a white, very hard, gritty, crystalline powder, or crystalline mass, permanent in air, free from odor, having a faintly sweet taste, a neutral reaction, *soluble* in 4.79 parts of water, and insoluble in alcohol. It is prepared by evaporating the whey of cow's milk and crystallizing. Sugar of milk is neutral to litmus paper, and dextro-

gyrate. It is sometimes adulterated with cane sugar, and not infrequently contains numerous microörganisms resulting from the decomposition of animal matter in the milk. Adulteration with cane sugar may be detected by placing about 5 Cc. of cold sulphuric acid in a flat-bottomed disk, and sprinkling over it about 1 Gm. of the powdered suspected sugar of milk, cover with a watch-glass, when, if the milk sugar is pure, the acid may become greenish or reddish; but if cane sugar is present, it will acquire a brown or brownish-black appearance within half an hour.

Action and Uses.—Sugar of milk is a food and a diuretic. It is extensively employed in preparing modified milk for bottle-fed infants. In *pharmacy,* it is a valuable diluent, and when triturated with other powders assists in reducing them to a fine state of subdivision.

Dose.—Any quantity.

SAFROLUM—Safrol

Formula, $C_{10}H_{10}O_2$ = 160.86.

Safrol is a colorless, or faintly yellowish liquid, having an odor suggestive of sassafras. It exists in Oil of Anise, and other volatile oils, but is mostly derived from the *red oil of camphor* by fractional distillation, and purified, if necessary, by repeated chilling and crystallization. It is soluble in alcohol, and freely miscible with ether and chloroform.

Action and Uses.—Its action and uses are the same as those of oil of sassafras.

Dose.—0.3 to 0.6 Cc.; 5 to 10 minims.

SALICINUM—Salicin

Family, Salicaceæ. *Formula,* $C_{13}H_{18}O_7$ = 283.99.

Salicin is a colorless, silky, shining, needle-shaped, or white, crystalline *glucoside,* obtained from the bark of several species of Willow, or Poplar. It is permanent in air, has a decidedly bitter taste, is *soluble* in 21 parts of water and 71 parts of alcohol. Its aqueous solution is dextrogyrate, and neutral to litmus paper.

Action and Uses.—When taken internally, the glucoside is changed in part to salicylic acid, and acts as such. It is used to a limited extent in the treatment of *rheumatism,* and also as an *antipyretic.* It is best *administered* in capsules or cachets.

Dose.—0.6 to 4 Gm.; 10 to 60 grains.

SALVIA—Salvia

Synonym, Sage Leaves. *Family,* Labiatæ.

Sage is the dried leaves of *Salvia officinalis,* the common semi-herb found growing in all parts of the United States, especially in the Southern

States. The leaves are about 2 inches (50 mm.) long; ovate-oblong; stoutly petiole; grayish-green and pubescent. They have an agreeable aromatic odor, and an aromatic, bitter, and somewhat astringent taste. The chief constituents of the leaves is a *volatile oil* and *tannin*.

Action and Uses.—Sage leaves enjoy some reputation in domestic medicine as a *diuretic*, *diaphoretic*, and *carminative*. It is very feeble, and the good, if any, incidental to its use is probably owing to the fact that it is usually administered as an infusion; warm drinks being valuable for the purposes above mentioned.

Dose.—2 to 4 Gm.; ½ to 1ʒ, in infusion.

SANGUINARIA—Sanguinaria

Synonym, Blood Root. *Family*, Papaveraceæ.

Sanguinaria, also known as Blood Root, or Red Pucoon, is the dry rhizome, collected in late summer or autumn after the death of the foliage of *Sanguinaria canadensis*, a common perennial herb growing in rich soils in woods and shady nooks.

The rhizome is in somewhat branched, cylindrical growths, about 1 to 3 inches (25 to 75 mm.) long, ⅕ to ⅗ inch (5 to 15 mm.) thick, reddish-brown externally, breaks with a short fracture, exposing a yellowish-white or brownish-red internal surface, surrounding a central pith. Its odor is slight, its taste persistently acrid and bitter.

The drug depends for its activity upon an acrid alkaloid, *sanguinarine*, and in addition contains several less important alkaloids and resins.

Action and Uses.—When employed either internally or externally, sanguinaria and its preparations are irritants. By reason of the fact that its dangerous properties are out of proportion to its value as a medicine, the drug has fallen into disuse. In medicinal doses, the drug is an *irritating emetic* and *stimulating expectorant*. It is too dangerous to be used as a safe emetic, but is still used occasionally as an expectorant in *subacute* and *chronic bronchitis*. In *overdoses*, the drug produces violent gastro-enteritis, a burning sensation, with considerable inflammation of the pharynx, thirst, salivation, visual disorders, sweating, subnormal temperature, respiratory and circulatory depression, and tetanic convulsions; death, if it ensues, is from respiratory failure.

Official Preparations

Fluidextractum Sanguinariæ (*Fluidextract of Sanguinaria*).—Menstruum, Acetic Acid, 25 parts; Water, 75 parts.

Dose.—0.06 to 0.2 Cc.; 1 to 3 minims.

Tinctura Sanguinariæ (*Tincture of Sanguinaria*).—Made by percolating 10 Gm. of Sanguinaria with a menstruum of 6 parts of Alcohol, 4 parts of Water, and 0.2 part of Acetic Acid, to make 100 Cc. of tincture.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

SANTALUM RUBRUM—Red Saunders

Family, Leguminosæ.

Red saunders, which is the heart-wood of *Pterocarpus santalinus,* a large native tree of India, is seen in the shops in brownish-red chips, or coarse powder, almost entirely free from odor or taste. The wood imparts its beautiful red color to alcohol, but not to water, and is used exclusively as a coloring agent. It is used in the preparation of Compound Tincture of Lavender.

SANTONICA—Santonica

Synonym, Levant Wormseed. *Family,* Compositæ.

Santonica is not a seed, as its synonym would seem to imply, but is the dried unexpanded flower heads (buds) of *Artemesia pauciflora,* a small, semishrubby plant, growing in northern Turkestan and Russia.

The flower heads are small, only $\frac{1}{12}$ to $\frac{1}{6}$ inch (2 to 4 mm.) long, $\frac{1}{25}$ inch (1 mm.) wide, oblong-ovoid in shape, yellowish-green or greenish-brown in color, having a strong, peculiar, somewhat camphoraceous odor, and an aromatic, bitter taste. In bulk, the drug has the appearance of a yellowish-green, or greenish-brown, granular powder.

Santonica, as a drug, is rarely used as an anthelmintic, but contains a neutral principle known as *santonin,* which is used as such.

Official Derivative

Santoninum (*Santonin*). *Formula,* $C_{15}H_{18}O_3 = 244.29$.—Santonin, the neutral principle, or, more correctly, the inner anhydride of lactone of santonic acid, obtained from *Santonica,* is seen in colorless, shiny, flattened prisms, permanent in air, but becoming yellow upon exposure to light. It dissolves sparingly in water, but the addition of sodium bicarbonate, or other alkalies, greatly increases its solubility (a condition not to be desired when administering it), and is soluble in alcohol, ether, and chloroform.

Action and Uses.—Santonin is an efficient anthelmintic, being of value to rid the alimentary tract of *round worms,* and to a limited degree *thread worms,* but *never* tapeworms. The anhydride should not be powdered nor mixed with sodium bicarbonate, as both measures increase its absorption from the stomach, so that when administered, it enters the circulation instead of passing into the intestinal tube to be devoured by the parasite, whose expulsion is intended. When absorbed, santonin acts as a diuretic; it also stains the fluids of the body a yellow color. The urine voided after the drug has been taken, if acid, is of a saffron-yellow color. In *overdoses,* santonin may cause yellow vision, muscular tremor, epileptiform convulsions, and coma. In medicinal doses, the drug occasionally gives rise to disagreeable symptoms, such as vomiting, tremors, and convulsive movements.

Santonin is best *administered* in crystals along with mild mercurous chloride. The substance should be mixed loosely and not powdered by trituration, nor mixed with sodium bicarbonate or any other alkali. It is intended that the worm should get the dose and not the individual, hence it should be prepared as suggested, and administered after a brief period of starvation.

Dose.—0.03 to 0.12 Gm.; $\frac{1}{2}$ to 2 grains.

Official Preparation of Santonin

Trochisci Santonini (*Troches of Santonin*).—Each troche contains about $\frac{1}{2}$ grain (0.03 Gm.) of Santonin, with Sugar, Tragacanth, and Stronger Orange-flower Water.

Dose.—1 to 4 troches.

SAPO—Soap

Synonym, White Castile Soap.

White castile soap is a firm, white solid, prepared from sodium hydroxide and olive oil. Its consistency is such that when fresh it may be easily cut; its reaction is alkaline, its odor faint and free from rancidity, and its solubility in water and alcohol is increased by heat. When properly made, it should contain not less than 36 per cent. of water, should be free from animal fats and metallic impurities, and should not be excessively alkaline.

When a fixed oil or fat is acted upon by an alkali, such as ammonia, sodium, or potassium hydroxide, it is saponified, or converted into soap. The fats and fixed oils contain palmitic, stearic, or oleic acid in chemical combination with glycerin, either as glyceryl tripalmitate, tristearate, or trioleate, which, in the presence of an alkali, is decomposed to form palmitates, stearates, or oleates with the alkali employed, glycerin being left in solution. The reaction is favored by boiling.

Soaps made with ammonia, sodium, or potassium hydroxide are *soluble,* those with earth and metallic oxides are *insoluble.* The first class are represented by the castile soap and soft soap, the latter by such preparations as lead plaster and lime liniment. Soaps may be hard or soft in consistency, according to the fatty acid existing in the oil and the alkali employed. They are of a *firm consistency* when palmitic or stearic acid predominates, and when sodium hydroxide is used as a saponifying agent they are *soft* or *semiliquid;* when oleic acid predominates in the fat or oil, potassium hydroxide is used. A hard soap is represented by castile soap; a soft, semifluid soap by the official soft soap, and by ammonia liniment.

Uses.—In addition to its value as a cleansing agent, castile soap in suppositories or solution is used *per rectum* to unload the lower bowel. It is a valuable pill excipient, especially for resins, which it renders more

soluble and less irritating. In addition to its use in preparing Lead Plaster, Compound Extract of Colocynth, and Pills of Aloes, of Asafetida, and of Opium, it is used in the following official preparations:

Official Preparations of Soap

Emplastrum Saponis (*Soap Plaster*).—Made by rubbing 10 Gm. of dry powdered Soap and Water, incorporating the semiliquid with 90 Gm. of Melted Lead Plaster. When melted by the aid of heat, and spread upon chamois skin or other material, it is used as a protective dressing.

Linimentum Saponis (*Soap Liniment*).—Made by adding 6 Gm. of Soap to Boiling Water to form a gelatinous mass, and while yet warm, dissolving in 50 Cc. of Alcohol, and then adding to it a solution of 4.5 Gm. of Camphor, and 1 Cc. of Oil of Rosemary dissolved in 22.5 Cc. of Alcohol, and lastly, if necessary, enough Water to make 100 Cc.

Used locally as an anodyne and mild rubefacient in *sprains, bruises,* etc.

SAPO MOLLIS—Soft Soap

Synonym, Green Soap.

Soft soap is a strongly alkaline, soft, unctuous, yellowish-brown mass, prepared by adding a warm aqueous solution of potassium hydroxide to warm linseed oil, thoroughly mixing, adding alcohol, and continuing the heat without stirring until a small quantity of the mixture is found to be soluble in boiling water, without the separation of oil drops. The proportion is about as follows:

Linseed Oil, 40 Gm.; Potassium Hydroxide, 9.5 Gm.; Alcohol, 4 Cc.; Water, a sufficient quantity to make 100 Cc. The substance is soluble in hot water, and nearly completely so in hot alcohol.

Action and Uses.—This *strongly alkaline* soap is used largely in *dermatological practice to cleanse the epidermis* of dried scales and crusts of fatty matter, and also as a powerful stimulating agent. Without dilution, it is liable to cause considerable irritation, and therefore the official liniment made from it is the preparation almost exclusively employed. After its use, the skin should be well washed to free it from the alkali.

Official Preparation of Soft Soap

Linimentum Saponis Mollis (*Liniment of Soft Soap*).—*Synonym,* Tincture of Green Soap.

Made by dissolving 65 Gm. of Soft Soap and 2 Cc. of Oil of Lavender Flowers in enough Alcohol to make 100 Cc. of liniment.

Used locally as a *stimulating detergent.* It is miscible with water.

SARSAPARILLA—Sarsaparilla

Family, Liliaceæ.

Sarsaparilla is the dried root of *Smilax ornata, Smilax medica, Smilax papyracea,* or an undetermined species of *Smilax,* probably *S. officinalis,* known as Honduras Sarsaparilla. The plants from which the roots are collected, are large, perennial, thorny climbers, growing in swampy forests of tropical America, from Mexico to Brazil. The roots externally vary in color from a light gray-brown to a dark orange-brown, are about the thickness of goose quills, usually several feet in length, longitudinally wrinkled, flexible, and having a thick cortical portion, covered by a thin, easily separable epidermis; its inner circular layer of woody fiber is whitish, and surrounds a central pith. In the dry state the roots are nearly inodorous, but in decoction acquire a distinct, peculiar odor. When chewed, the taste is at first mucilaginous and somewhat sweetish and very slightly bitter, but after a time produces an acrid, disagreeable sensation to the fauces. The drug contains several feeble glucosides known as *parillin, saponin, sarsa-saponin,* and a *resin.*

Action and Uses.—Sarsaparilla enjoys a popular reputation as a blood purifier, but is probably useless as such. Its official preparations are useful vehicles for administering active remedies, and cannot be said to be entirely devoid of medicinal action, and furthermore are agreeable in taste and odor. These pleasant properties in the compound preparation are due to sugar, glycyrrhiza, sassafras, and aromatic oils, while these medicinal actions are probably more largely due to the senna in the compound syrup, and mezereum in the compound fluidextract, than to the sarsaparilla in either.

Official Preparations

Fluidextractum Sarsaparillæ (*Fluidextract of Sarsaparilla*).—Menstruum, Alcohol, 1 part; Water, 2 parts.

Dose.—2 to 4 Cc.; ½ to 1 f℥.

Fluidextractum Sarsaparillæ Compositum (*Compound Fluidextract of Sarsaparilla*).

Ingredients.—Sarsaparilla, 75 Gm.; Glycyrrhiza, 12 Gm.; Sassafras, 10 Gm.; Mezereum, 3 Gm.; Glycerin, 10 Cc.; Diluted Alcohol, a sufficient quantity to make 100 Cc.

Dose.—2 to 4 Cc.; ½ to 1 f℥.

Syrupus Sarsaparillæ Compositus (*Compound Syrup of Sarsaparilla*).

Ingredients.—Fluidextract of Sarsaparilla, 20 Cc.; Fluidextract of Glycyrrhiza, 1.5 Cc.; Fluidextract of Senna, 1.5 Cc.; Sugar, 65 Gm.; Oil of Sassafras, 0.02 Cc.; Oil of Anise, 0.02 Cc.; Oil of Gaultheria, 0.02 Cc.; Water, a sufficient quantity to make 100 Cc.

This preparation is a mild laxative. It is used mostly as a vehicle.

Dose.—4 to 16 Cc.; 1 to 4 f℥.

SASSAFRAS—Sassafras

Family, Lauraceæ.

Sassafras is the dried bark, deprived of its outer corky layer, of the root of *Sassafras variifolium*, growing in the southern United States as a tree twenty to forty feet in height, while in the northern New England States it is shrubby. The bark is collected from fresh roots and dried. It is seen in the shops as irregular, transversely curved, reddish-brown, or deep cinnamon-brown fragments, which break with a corky fracture, is fragrant in odor, and has a mucilaginous, aromatic, astringent taste. It contains gum, a *volatile oil*, a camphoraceous substance, and tannin.

Action and Uses.—Sassafras bark is an aromatic stimulant and feeble astringent. An infusion of the bark is popular as a household remedy in *simple* and *eruptive fevers, diarrhea*, and *dysmenorrhea*. It enters into the composition of Compound Fluidextract of Sarsaparilla.

Dose.—4 to 16 Gm.; 1 to 4ʒ, in infusion.

Official Derivative

Oleum Sassafras (*Oil of Sassafras*).—A yellow, or reddish-yellow volatile oil obtained by distillation from the bark of sassafras root. It possesses the characteristic odor, taste, and aromatic properties of sassafras bark. The oil is an ingredient of the Compound Syrup of Sarsaparilla, and of Troches of Cubeb, and is a popular flavoring agent.

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

SASSAFRAS MEDULLA—Sassafras Pith

The dried pith of Sassafras, collected in the spring or autumn after frost, from the branches of the tree. It is seen in very light, white, spongy, cylindrical, curved, or coiled pieces, consisting almost entirely of parenchyma. The pith is free from odor, is insipid and mucilaginous when chewed, and contains an abundance of gum which is soluble in water and not precipitated by alcohol.

Action and Uses.—A mucilage, made by treating the pith with Water, is a demulcent, useful as a local application in treating *conjunctivitis*, and internally in *acute inflammation of the stomach and bowels*. As the mucilage decomposes and becomes sour when long kept, it should be freshly prepared when wanted.

Official Preparation of Sassafras Pith

Mucilago Sassafras Medullæ (*Mucilage of Sassafras Pith*).—Prepared by macerating 2 Gm. of Sassafras Pith in 100 Cc. of Water for three hours, and straining.

Dose.—4 to 16 Cc.; 1 to 4 f ʒ.

SCAMMONIUM—Scammony

Family, Convolvulaceæ.

Scammony is a gum-resin obtained as an exudate by incising the living root of *Convolvulus scammonia,* a perennial herb with numerous long, slender, twining branches, which spread themselves upon the ground and twine about other bushes, and a stout, perpendicular tapering root, about 3 to 4 feet long, and about 1 to 4 inches thick. The gum-resin is obtained by incising the root of the living plant, or cutting it through at its crown, and collecting and drying the milky juice that exudes. Much of the scammony upon the market is adulterated, while still soft, with flour, starch, sand, chalk, powdered scammony root, and other substances, and, therefore, the *United States Pharmacopœia* has directed that the official gum-resin shall be free from these impurities, and that not less than 75 per cent. of the drug shall be soluble in ether, this quantity representing the amount of resin which should be present. As ordinarily seen in the shops, the drug is in circular cakes or irregular masses of various sizes, greenish-gray or brownish-black in color, and often covered with a grayish-white powder; internally, it is of a brownish-black color; thin fragments are more or less translucent. It is brittle, easily pulverizable, has a peculiar odor somewhat resembling old cheese, and has a slightly acrid taste; alcohol and ether partially *dissolve* it. When triturated with water, it yields a greenish emulsion. The medicinal properties of scammony are dependent upon its *resin,* of which it should contain at least 75 per cent.

Action and Uses.—Scammony is used as a *hydragogue cathartic,* but, as it causes a good deal of griping, is usually prescribed in combination with other purgatives. On account of the impurities likely to be found in the gum-resin, the official resin of scammony is considered more reliable and is more frequently employed. The drug is best *prescribed* in pills or capsules.

Dose.—0.12 to 0.6 Gm.; 2 to 10 grains.

Official Derivative

Resina Scammonii (*Resin of Scammony*).—Yellowish-brown, or brownish-yellow masses or fragments, or a yellowish-white, or grayish-white powder. The fragments are brittle, breaking with glossy resinous fracture, and are translucent at the edges. It is *soluble* in alcohol, turpentine, and almost completely soluble in ether, chloroform, and also in strong aqueous alkaline liquids.

This resin enters into the composition of Compound Extract of Colocynth, which, in turn, is one of the ingredients of Compound Cathartic Pills, and Vegetable Cathartic Pills.

Dose.—0.12 to 0.5 Gm.; 2 to 8 grains.

SCILLA—Squill

Synonym, Sea Onion. *Family,* Liliaceæ.

Squill consists of irregular, curved, dull, yellowish-white or rose-tinted, dried slices of the bulb of Squill, *Urginea maritima,* a perennial herb growing in countries bordering on the Mediterranean Sea. The dried membranous outer scales and central portions of the bulb are rejected. The drug absorbs moisture and becomes tough and flexible when moist, and is pulverizable when dry. It has only a slight odor, is mucilaginous, bitter and acrid to the taste. The virtues of the drug may be extracted by water, diluted acetic acid, or alcohol.

Squill depends for its medicinal activity upon a bitter principle known as *scillitin,* which analysis has shown to be composed of *scillipicrin, scillitoxin,* and *scillin;* it also contains a mucilaginous principle *sinistrin.*

Action and Uses.—Squill is a stimulating expectorant and diuretic, and is used in treating *bronchitis* in its subacute stage, and also *chronic nephritis.* In *dropsy,* it is usual to combine it with digitalis. In powder, it may be *administered* in pills or capsules.

It is an ingredient of a number of official liquids: The Fluidextract of Squill, and the Vinegar of Squill, in which diluted acetic acid is used as a menstruum, and the Syrup of Squill, made by dissolving sugar in vinegar of squill, being acid in reaction, should not be combined in prescription with ammonium carbonate or other alkali carbonates.

Poisoning.—Squill in overdoses may excite violent vomiting and purging, suppress the urine, cause bloody urine, circulatory depression, stupor, convulsions, subnormal temperature, and even death.

Dose.—0.06 to 0.3 Gm.; 1 to 5 grains.

Official Preparations

Acetum Scillæ (*Vinegar of Squill*).—Made by macerating and then percolating 10 Gm. of Squill with Diluted Acetic Acid to make 100 Cc. of Vinegar of Squill.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

Fluidextractum Scillæ (*Fluidextract of Squill*).—Menstruum, Acetic Acid, 1 part; Water, 9 parts.

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

Syrupus Scillæ (*Syrup of Squill*).—Made by dissolving 80 Gm. of Sugar in 45 Cc. of Vinegar of Squill, and enough Water to make 100 Cc. of syrup.

Dose.—2 to 4 Cc.; ½ to 1 f℥.

Syrupus Scillæ Compositus (*Compound Syrup of Squill*). *Synonym,* Coxe's Hive Syrup.

Ingredients.—Fluidextract of Squill, 8 Cc.; Fluidextract of Senega, 8 Cc.; Antimony and Potassium Tartrate, 0.2 Gm.; Sugar, 75 Gm.; Water, a sufficient quantity to make 100 Cc.

Dose.—0.6 to 4 Cc.; 10 to 60 minims.

Tinctura Scillæ (*Tincture of Squill*).—Made by percolating 10 Gm. of Squill with a menstruum of 3 parts of Alcohol and 1 part of Water, to make 100 Cc. of tincture.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

SCOPARIUS—Scoparius

Synonym, Broom. *Family,* Leguminosæ.

Scoparius is the dried tops of the branches of *Cytisus Scoparius,* a shrub indigenous in western Asia, southern and western Europe, and cultivated in gardens in the Southern and Middle United States.

The drug is seen in the shops in thin, flexible, fine winged, dark green, branched twigs, $\frac{1}{12}$ to $\frac{1}{8}$ inch (2 to 3 mm.) thick, having a disagreeable, bitter taste, and, when bruised, a peculiar odor.

It contains a bitter crystalline, *scoparin,* and *sparteine,* the latter a liquid, volatile alkaloid, which is neutralized by acids and forms crystalline salts. It is upon this alkaloid that scoparius depends for its medicinal properties.

Action and Uses.—Scoparius is of value chiefly on account of its stimulating effect upon the circulation, and its diuretic properties. In medicinal doses, it increases the force and frequency of the heart beats, and raises arterial pressure. In large doses, it acts as a depressant to the central nervous system and to the respiratory system; in lethal doses, it kills by paralyzing the respiratory centre. Salts of the alkaloid of spartein, and an infusion of the drug is used in *cardiac dilatation, mitral regurgitation* with cardiac enfeeblement, *cardiac arrhythmia, cardiac palpitation,* and, in fact, all those circulatory conditions in which digitalis is employed. Ordinarily it is less powerful and less valuable than digitalis, but is occasionally found valuable when digitalis fails.

Dose.—0.3 to 1 Gm.; 5 to 15 grains, in infusion.

Official Derivative

Sparteinæ Sulphas (*Sparteine Sulphate*).—*Formula,* $C_{15}H_{26}N_2.H_2SO_4 + 5H_2O = 419.26$.—This alkaloidal salt of sparteine is seen in colorless crystals, or as a crystalline powder. It has a slightly saline and bitter taste, an acid reaction upon litmus paper, is hygroscopic, and *dissolves* freely in alcohol and in water.

Dose.—0.003 to 0.03 Gm.; $\frac{1}{20}$ to $\frac{1}{2}$ grain.

SCOPOLA—Scopola

Family, Solanaceæ.

Scopola is the dried rhizome of *Scopola Carniolica,* a shrub indigenous to Bavaria, Austria Hungary, and southwestern Russia.

The rhizome is in cylindraceous pieces, 1 to 3 inches (25 to 75 mm.) long, $\frac{1}{2}$ to $\frac{2}{3}$ inch (8 to 16 mm.) thick, somewhat flattened vertically, curved and sharply flexuous, upper surface marked by cup-shaped scars; externally, yellowish-brown to brownish-gray in color, and finely longitudinally wrinkled; when broken, it shows a yellowish-white bark with a dark, corky layer, and a whitish indistinctly radiate woody tissue surrounding a central pith. Its taste is sweetish, afterward bitterish, and strongly acrid. The drug should contain not less than 0.5 per cent. of mydriatic alkaloids. Scopola is closely allied to belladonna and hyoscyamus, and contains the alkaloids, *scopolamine, hyoscyamine,* and *atropine,* the first chemically identical to hyoscine.

Action and Uses.—The action and uses of scopola are the same as those of belladonna, and of scopolamine the same as those of hyoscine. (See *Belladonna* and *Hyoscyamus.*)

Dose.—0.6 to 0.2 Gm.; 1 to 3 grains.

Official Preparations and Derivative

Extractum Scopolæ (*Extract of Scopola*).—A *pilular extract* made by evaporating the fluidextract of scopola. Should contain 2 per cent. of mydriatic alkaloids.

Dose.—0.01 to 0.02 Gm.; $\frac{1}{6}$ to $\frac{1}{3}$ grain.

Fluidextractum Scopolæ (*Fluidextract of Scopola*). — Menstruum, Alcohol, 8 parts; Water, 2 parts. Should contain 0.5 Gm. of mydriatic alkaloids from scopola in 100 Cc. of fluidextract.

Dose.—0.06 to 0.2 Cc.; 1 to 3 minims.

Scopolaminæ Hydrobromidum (*Scopolamine Hydrobromide*).—*Formula,* $C_{17}H_{21}NO_4.HBr+3H_2O=434.92$.—Transparent, colorless, slightly efflorescent crystals, soluble in 1.5 parts of water, and 15 parts of alcohol.

Action and uses similar to hyoscine hydrobromide. (See Hyoscyamus.)

Dose.—0.0003 to 0.0006 Gm.; $\frac{1}{200}$ to $\frac{1}{100}$ grain.

SCUTELLARIA—Scutellaria

Synonym, Skullcap. *Family,* Labiatæ.

Scutellaria is the dried plant of *Scutellaria lateriflora,* a perennial herb indigenous to the United States. The plant, which grows in damp thickets in States west of Alabama, is about 1 to 2 ft. (30 to 60 cm.) high, with quadrangular branching stem, ovate-lanceolate, or ovate-oblong, serrated leaves about 2 inches (50 mm.) long; flowers pale blue

in axillary one-sided racemes, and has only a slight odor and bitterish taste.

The drug contains a small quantity of *volatile oil,* tannin, and a bitter principle.

Action and Uses.—Scutellaria is probably devoid of any medicinal action. A tea or infusion made from it is popular as a domestic remedy. It has been used in the treatment of *hydrophobia, cholera, delirium tremens,* and a number of other diseased conditions in which it is probably useless.

Dose.—2 to 4 Gm.; ½ to 1 ʒ, in infusion.

Official Preparation

Fluidextractum Scutellariæ (*Fluidextract of Scutellaria*). — Menstruum, diluted alcohol.

Dose.—2 to 4 Cc.; ½ to 1 f ʒ.

SENEGA—Senega

Synonym, Seneca root, Snake-root. *Family,* Polygalaceæ.

Senega is the dried root of *Polygala Senega,* a permanent herb indigenous to the United States and Canada, now chiefly collected in the States west of the Rocky Mountains.

The root is somewhat cylindrical, tapering, 1 to 6 inches (3 to 15 cm.) long, $\frac{1}{12}$ to $\frac{1}{3}$ inch (2 to 8 mm.) thick, with several horizontal branches and rootlets and knotty crown. It is yellowish-gray, or yellowish-brown externally, longitudinally wrinkled, and marked by a keel usually most prominent near its crown; internally, it is light yellow. The root has a faint, nauseating odor and a sweetish, afterward acrid taste, and, when chewed, produces a burning sensation in the fauces.

Senega depends for its medicinal properties upon *senegin,* a neutral glucoside, and *polygalic acid,* and, in addition, contains *pectin,* albuminoids, resin, a small quantity of volatile oil, fixed oils, and coloring matter. The virtues of the drug may be extracted by hot or cold water, or hot alcohol. When making preparations of senega, a small quantity of an alkali is usually added to the menstruum employed; this more thoroughly exhausts the drug of its active principles, and also prevents gelatinization in the preparation.

Action and Uses.—Senega is a stimulating expectorant and diuretic. In *overdoses,* it produces vomiting and purging. It is used almost exclusively to stimulate secretion in *subacute* and *chronic bronchitis,* usually in combination with other expectorants.

Dose.—0.6 to 1.2 Gm.; 10 to 20 grains, in infusion.

Official Preparations

Fluidextractum Senegæ (*Fluidextract of Senega*).—Menstruum, Alcohol, 6 parts; Water, 3 parts; and solution of Potassium Hydroxide, 0.3 part.

Used as an expectorant, and also enters into the composition of Syrup of Senega, and Compound Syrup of Squill.

Dose.—0.6 to 1.2 Cc.; 10 to 20 minims.

Syrupus Senegæ (*Syrup of Senega*).—Made by mixing Fluidextract of Senega, 20 Cc., with Syrup, 80 Cc.

Dose.—2 to 8 Cc.; ½ to 2 f℥.

SENNA—Senna

Family, Leguminosæ.

Alexandria Senna is the dried leaflets of *Cassia acutifolia,* a shrub 2 to 3 feet high, growing in eastern and central Africa, while the other official variety known as India Senna is the leaflets from *Cassia angustifolia,* also a shrub of about the same size, growing, as its name implies, in India.

The leaflets of Alexandria senna are about 1 inch (25 mm.) long, ⅖ inch (10 mm.) broad, have a very short leaf stalk, are rather pointed, unequally oblique at their bases, entire along their margins, greenish-gray, pubescent; their odor is peculiar and their taste somewhat mucilaginous and bitter.

India senna leaflets are from 1 to 2 inches (25 to 50 mm.) long, ⅖ to ⅗ inch (10 to 15 mm.) wide; entire along their margins, unequally oblique at their bases, thin, more abruptly pointed than Alexandria senna, yellowish-green, smooth above, and pale beneath. The drug should be free from stalks, Argel leaves, or Coriaria leaves, with which it is sometimes adulterated.

A number of principles have been isolated from senna, but its chief purgative principle is *cathartic acid,* a glucoside possessing a weak acid character. The drug yields its properties to hot and cold water and to diluted alcohol, but not fully to strong alcohol. Acids and alkalies neutralize the effect of senna, rendering it less active.

Action and Uses—Senna is an active *laxative,* which, by stimulating the bowel, increases peristalsis and intestinal secretion. Its laxative effect is usually accompanied by considerable griping, which may be minimized by the admixture of coriander, fennel, manna, magnesium sulphate, or sodium and potassium tartrate. The cathartic principle is eliminated in the milk of women nursing infants. The drug causes the urine to become red, a condition which may be mistaken for hematuria.

In addition to its official preparations, the drug enters into the composition of Compound Powder of Glycyrrhiza, and its fluidextract into Compound Syrup of Sarsaparilla.

Dose.—2 to 8 Gm.; ½ to 2 ℥, in powder.

Official Preparations

Confectio Sennæ (*Confection of Senna*).—A soft, pasty mass made from Senna, 10 Gm.; Cassia Fistula, 16 Gm.; Tamarind, 10 Gm.; Prune, 7 Gm.; Fig, 12 Gm.; Sugar, 55.5 Gm.; Oil of Coriander, 0.5 Gm.; Water, a sufficient quantity to make 100 Gm.

Dose.—As a laxative, about 8 Gm.; 2 ʒ.

Fluidextractum Sennæ (*Fluidextract of Senna*).—Made by treating 100 Gm. of powdered Senna with Alcohol to remove its griping principle, drying this powder, and then exhausting with Diluted Alcohol to make 100 Cc. of fluidextract.

Dose.—4 to 8 Cc.; 1 to 2 f ʒ.

Infusum Sennæ Compositum (*Compound Infusion of Senna*). *Synonym,* Black Draught.—Made by treating 60 Gm. of Senna, 120 Gm. of Manna, 120 Gm. of Magnesium sulphate, and 20 Gm. of Fennel, with Boiling Water, and straining to make 1000 Cc. of infusion.

Dose.—60 to 240 Cc.; 2 to 8 f ʒ.

Syrupus Sennæ (*Syrup of Senna*).—Made by dissolving 0.5 Cc. of Oil of Coriander in 25 Cc. of Fluidextract of Senna, and adding enough Syrup to make 100 Cc. of the syrup.

Dose.—4 to 16 Cc.; 1 to 4 f ʒ.

SERPENTARIA—Serpentaria

Synonym, Snake-root. *Family,* Aristolochiaceæ.

Serpentaria is the dried rhizome and roots of *Aristolochia Serpentaria,* or of *Aristolochia reticulata,* perennial herbs indigenous to the United States. The first variety has a rhizome of oblique growth, 1 inch (25 mm.) long, and $\frac{1}{12}$ inch (2 mm.) in diameter; externally, it is yellowish-brown; its upper surface marked by numerous stem-scars, and its lower surface by small, fibrous roots; internally, yellowish-brown. The drug has a camphoraceous odor, and a bitter, aromatic taste. The second variety is larger than the former, being about 2 inches (50 mm.) long, $\frac{1}{6}$ inch (4 mm.) in diameter; is grayish-brown in color, and has fewer interlacing roots attached to its lower surface.

The drug contains volatile oil, *aristolochine,* resin, tannin, mucilage, and albumin.

Action and Uses.—Serpentaria is a feeble stimulating bitter tonic, and a mild diaphoretic and diuretic. It is used in *anorexia,* and in *gastro-intestinal catarrh.* It is one of the ingredients of Compound Tincture of Cinchona. In *excessive doses,* the drug produces vomiting, and purging, accompanied by a good deal of griping.

Dose.—0.6 to 2 Gm.; 10 to 30 grains, in infusion.

Official Preparations

Fluidextractum Serpentariæ (*Fluidextract of Serpentaria*).—Made with a menstruum of Alcohol, 4 parts, and Water, 1 part.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

Tinctura Serpentariæ (*Tincture of Serpentaria*).—Made by percolating 20 Gm. of Serpentaria with a sufficient quantity of menstruum (65 Cc. Alcohol; 35 Cc. Water) to make 100 Cc.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

℞ SERUM ANTIDIPHTHERICUM—Antidiphtheric Serum

Synonym, Diphtheria Antitoxin.

Antidiphtheric serum, commonly known as Diphtheria Antitoxin, is the serum of the blood of a horse immunized against the effects of the toxin of diphtheriæ bacilli. In preparing the liquid, a horse is injected subcutaneously or intravenously with gradually increasing quantities of a carefully prepared and standardized toxin of diphtheriæ bacilli, at intervals of several days or a week, until the animal no longer reacts to the treatment. The first injection of the toxin produces a slight swelling at and around the seat of the puncture, a rise of temperature, and the horse loses its appetite. After several days, when these symptoms have disappeared, another somewhat larger quantity of toxin is administered, and the process repeated until the animal ceases to react. When this period is reached the horse is known to be immune to diphtheria toxin, and its serum, when tested upon guinea-pigs injected with diphtheria toxin, will be found to neutralize the effect of that poison. When thus immunized, a trocar armed with a cannula is plunged into the external jugular vein of the horse, a large quantity of its blood drawn off into sterile flasks or tubes, and allowed to clot, after which the serum is collected. Ordinarily, a small quantity of tricresol, or some other antiseptic, is added as a preservative.

The serum thus prepared and previously tested upon guinea-pigs, to determine its antitoxic strength, is placed in tubes, bottles, or other containers, carefully sealed and labelled.

The antitoxic power of antidiphtheric serum is calculated in units of an antitoxic strength. The number of antitoxic units in each cubic centimeter of the serum depends but to a slight degree upon the method of its preparation, but almost entirely upon the antitoxin producing power of the horse employed. Some horses may be made to yield a serum containing as much as 1000, rarely 2000, units of antitoxin to each cubic centimeter of serum, while others cannot be made to produce a serum containing more than 150 to 200 units to each cubic centimeter. The antitoxin unit is not a quantity by measure of capacity, but a quantity measured by its power to neutralize diphtheria toxin,

A unit of antitoxin is that arbitrary quantity of antitoxic serum required to neutralize the effect of one ~~hundred~~ ten times the lethal dose of diphtheria toxin. Antidiphtheric serum is tested and standardized by injecting guinea-pigs with ten times the minimum lethal dose of a pure standardized diphtheria toxin, following by or using simultaneously a dose of antidiphtheric serum.

Antidiphtheric serum of very high potency, and even in the dry state, may be prepared by special processes, but no active principle has been separated or, in fact, determined. Several manufacturers have placed upon the market beautifully clear, colorless, and highly potent sera prepared from globulins from the blood of immunized horses.

The United States Government, by an act of Congress, has thrown a legal protection around the manufacture of diphtheria antitoxin, so as to insure its purity and potency.

It is required that all packages containing diphtheria antitoxin offered for sale in interstate commerce shall be properly labeled with the name and license number of the manufacturer, the number of antitoxic units contained in the package, and the date beyond which the contents may be reasonably expected to yield specific results. The label should also indicate the name and quantity by volume of the antiseptic used to preserve the contents.

Serum is a yellowish, or yellowish-brown liquid, transparent or slightly turbid, and usually having the slight odor of tricresol used to preserve it. It should be kept in a dark place, at a temperature between 4.5° and 15° C. (40° and 59° F.), to prevent rapid deterioration. The antitoxic strength of the serum gradually lessens, the loss in one year varying between 10 and 30 per cent.

Action and Uses.—Antidiphtheric serum is administered hypodermically to cure diphtheria, and also to prevent the onset of that disease in individuals exposed to the infection. In both instances, it is injected deeply into the muscles of the back or buttocks. The remedy, to be of greatest value in treating diphtheria, should be employed at the very earliest onset of the disease, as it prevents the growth of the bacilli of diphtheria, and neutralizes its toxin. It does not, however, repair the damage already done by the toxin. While of greatest value when used early, the serum should not be withheld in cases coming under treatment at a later stage. The value of this remarkable therapeutic agent is unquestioned, and as few harmful results have followed its use, the remedy should be used promptly in every case of suspected diphtheria, not waiting until the diagnosis has been confirmed by a bacteriological examination. It is true that after its injection the patient occasionally develops a rash or swelling of the joints, with a rise of temperature, but these slight inconveniences are of no consequence as compared with the remarkable benefits resulting from its use.

About 1 person in 10,000 injected with antidiphtheric serum develops within a few minutes alarming and serious symptoms. These alarming symptoms are usually followed by complete recovery in a few hours,

but an occasional death has followed. Individuals thus affected have been known to be asthmatic subjects, or having pathological changes known as status lymphaticus. For *treatment*, an initial dose of from 2000 to 3000 units is usually considered a sufficient dose, but much larger doses are advocated by some. It is usual to repeat the initial dose after twenty-four hours if the first has not been sufficiently effective. A third and successive doses are not uncommon. When used to *prevent the onset of diphtheria* in those exposed to the contagion of the disease, the serum is administered hypodermically in doses of about 300 units for infants, and 500 units for adults. Such injections protect the individual for a period of about two or three weeks, when if it is thought advisable, it may be repeated.

There is some experimental evidence proving that guinea-pigs previously sensitized with horse serum may develop alarming symptoms followed by death when given subsequent injections. This has led to some caution in the use of repeated doses of serum employed for immunizing persons. It is not known, however, that human beings may be sensitized with horse serum, nor have we any knowledge of death having followed immunizing doses of antidiphtheric serum, although it has been employed upon children hundreds of thousands of times at short and long intervals. Furthermore, as pointed out by Parke, "A dose (of serum) in man comparable to the amount required to produce sickness in a guinea-pig would be over 200 Cc.," and, of course, no such enormous quantities are ever required or employed.

SEVUM PRÆPARATUM—Prepared Suet

Synonym, Mutton Suet.

Prepared suet is a white, solid fat, prepared by melting and straining the internal fat of the abdomen of sheep. It is insoluble in water and cold alcohol, but dissolves in 44 parts of boiling alcohol, and in 60 parts of ether. It also *dissolves* in about 2 parts of petroleum benzin, from which it slowly separates in crystalline form when kept standing in well-stoppered flasks. Suet melts at between 45° and 50° C. (113° and 122° F.), congeals between 37° and 40° C. (98.6° and 104° F.), and becomes rancid upon long exposure to the air. Prepared suet contains about 70 to 80 per cent. of stearin and palmitin, and 20 to 30 per cent. of olein.

Action and Uses.—Suet may be applied by inunction to the body to protect it from cold, and to soften the skin. It is popular as a local soothing application in *chaps* and *fissures* of the hands, face, and the like, and for *slight burns*. It enters into the composition of Compound Resin Cerate, and Mercurial Ointment.

April 4/16

SINAPIS ALBA—White Mustard

Family, Cruciferæ.

White Mustard is the seed of *Sinapis alba,* a small herb indigenous to Asia and southern Europe, and cultivated in gardens, and growing wild in the United States.

The seeds are subglobular, about $\frac{1}{25}$ to $\frac{1}{12}$ inch (1 to 2 mm.) in diameter, yellowish, and have a mild pungent and acrid taste. Powdered mustard is sometimes found to be adulterated with starch.

The drug contains fixed oils, *sinalbin, sinapine, sulphocyanide,* a ferment *myrosin,* albumin, gum, and mucilage. In the presence of water, myrosin acts upon sinalbin, developing *allyl sulphocyanide,* a yellow, acrid, non-volatile oil. Warm water develops the epispastic properties of mustard, but hot water kills the ferment and prevents the development of this property.

SINAPIS NIGRA—Black Mustard

Family, Cruciferæ.

The seed of black mustard is obtained from *Brassica nigra,* an herb growing under the same conditions as the plant furnishing white mustard.

It is subglobular, somewhat smaller than white mustard, deep brown in color, sometimes of a grayish tinge, having only a slight odor when dry, but, when moistened, powerfully irritating. Its taste is strongly pungent and acrid. Powdered black mustard is sometimes found to be adulterated with starch. It contains fixed oils, *sinigrin, sinapine, sulphocyanide,* a ferment *myrosin,* albumin, gum, and mucilage. In the presence of water, myrosin acts upon sinigrin, developing *allyl sulphocyanide* (Volatile Oil of Mustard). Warm water develops the epispastic properties of mustard, but hot water kills the ferment and prevents the development of this property.

Action and Uses of White and Black Mustard.—The action of white (yellow) and black mustard is similar, except that the former is much milder. Mustard administered internally in small doses is a stimulant, carminative, condiment, and laxative, and, in large doses, an *emetic.* Locally, it is a *rubefacient,* irritant, or *epispastic.* Ground mustard, mixed with flour or ground flax-seed, moistened with warm water and spread between soft cloths, is used locally as a counterirritant, or as a blistering agent for the relief of *pain,* or for the treatment of *deep-seated inflammations.* When used as a counterirritant upon children, one part of mustard may be mixed with ten parts of flour; for adults with less sensitive skin, one part of mustard with four parts of flour should be employed. When used to produce a blister equal parts of mustard and flour may be mixed, but in some instances it is necessary to use a larger proportion of mustard. It is a matter of considerable importance to

know that local applications of mustard occasionally produce a permanent brownish pigmentation of the skin at the seat of its application. When used as an emetic, ground mustard may be stirred in a glass of water and drunk. Its action is prompt and is accompanied by slight nausea; but the drug occasionally produces a rather violent gastritis.

Dose.—8 Gm.; 2 ℥.

Official Preparation

Charta Sinapis (*Mustard Paper*).—Made by percolating ground Black Mustard with Petroleum Benzin, drying by exposure to the air, and mixing the powder thoroughly with a solution of Rubber in Carbon Disulphide to produce a semiliquid magma, spreading by means of a brush upon one side of a rather thick, well-sized paper and allowing it to dry. Mustard paper is used as a counterirritant, by moistening with warm water, covering with thin old muslin or gauze, and applying to the skin.

Derivative of Mustard

Oleum Sinapis Volatile (*Volatile Oil of Mustard*)—Volatile oil of mustard is a colorless, or pale yellow, volatile oil, having a very pungent and acrid odor, obtained from black mustard by maceration with water and subsequent distillation. It should contain not less than 92 per cent. of allyl isothiocyanate. The oil has a highly acrid and pungent odor, is actively irritating, and should, therefore, be smelled very cautiously, and not tasted unless highly diluted. Volatile oil of mustard, when freely diluted with olive oil, may be used as a counterirritant. In the undiluted state it is an epispastic. This oil is too powerful for internal administration.

Dose.—The U. S. P. states its dose as 0.008 Cc.; $\frac{1}{8}$ minim.

SODIUM SALTS AND PREPARATIONS

Formula, Na = 22.88.

The metal sodium is *not official*, but many of its salts and compounds are among the most important of the substances used in medicine. Sodium is a soft, malleable, ductile solid, of a silver-white luster; its newly cut surface has a brilliant metallic luster, which quickly tarnishes upon exposure to the air. Like potassium, this alkali metal has a strong affinity for oxygen, but in somewhat lesser degree, and must be preserved beneath naphtha or liquid petroleum. Upon exposure, it rapidly oxidizes, undergoes slow combustion, and is luminous in the dark; if thrown upon water it fuses, but does not ignite, the globule spins about on the surface of the water, decomposes, and forms sodium hydroxide, which dissolves as it forms, giving the liquid a strongly alka-

line reaction. The sodium base acts as a carrier for many acids and positive elements. It is less depressing than the potassium base.

Official Salts and Preparations

Sodii Acetas (*Sodium Acetate*). *Formula*, $NaC_2H_3O_2 + 3H_2O = 135.10$. —Colorless, transparent, monoclinic prisms, or a granular, crystalline powder, made by adding sodium carbonate to acetic acid, concentrating and crystallizing or granulating. It is odorless, has a cooling, saline taste; in solution, it changes the color of red litmus paper to blue, but does not affect phenolphthalein; it effloresces in warm, dry air, and is *soluble* in 1 part of water, and 23 parts of alcohol.

Action and Uses.—Sodium acetate is absorbed and circulates in the blood as sodium carbonate, and in this changed state is eliminated in the urine and other fluids of the body. It is used in the treatment of *rheumatism*, and as an alkaline diuretic. The salt is usually *prescribed* in aqueous solution, but as it is not deliquescent like potassium acetate, it may be dispensed in powders.

Dose.—0.6 to 3 Gm.; 10 to 45 grains.

Sodii Arsenas (*Sodium Arsenate*). *Formula*, $Na_2HAsO_4 + 7H_2O = 309.84$.—Colorless, transparent, monoclinic prisms, containing in the uneffloresecent state not less than 98 per cent. of pure di-sodium-ortho-arsenate. The salt is odorless, has a mild, alkaline taste, but, being very poisonous, *caution* should be observed in tasting it. The crystals are efflorescent in dry air, somewhat deliquescent in moist air, *soluble* in 1.2 part of water, very sparingly soluble in alcohol. When gently heated, the salt loses 5 molecules of water and is converted into a white powder.

Action and Uses.—Its action, uses, poisonous symptoms, treatment of poisoning, and incompatibilities are considered under Arsenic and its compounds.

Dose.—0.002 to 0.006 Gm.; $\frac{1}{30}$ to $\frac{1}{10}$ grain.

Sodii Arsenas Exsiccatus (*Exsiccated Sodium Arsenate*). *Formula*, $Na_2HAsO_4 = 184.68$.—An amorphous, white powder containing not less than 98 per cent. of pure anhydrous di-sodium-ortho-arsenate. Made by allowing crystals of sodium arsenate to effloresce at a temperature between 40° and 50° C. (104° and 122° F.) until they completely disintegrate, and then gradually increasing the temperature to 150° C. (302° F.) and continuing the drying until the product ceases to lose weight. The powder is permanent in air, *soluble* in 3 parts of water, and sparingly soluble in alcohol.

Action and Uses.—The action and uses of this substance are the same as sodium arsenate, its dose being about 28 per cent. less. The salt is employed in making Solution of Sodium Arsenate.

Dose.—0.0015 to 0.004 Gm.; $\frac{1}{40}$ to $\frac{1}{15}$ grain.

Liquor Sodii Arsenatis (*Solution of Sodium Arsenate*). *Synonym*, Pearson's Solution.—A colorless, aqueous liquid, containing not less

than 1 per cent. of exsiccated sodium arsenate. It is made by dissolving 1 Gm. of Exsiccated Sodium Arsenate in a sufficient quantity of Distilled Water to make 100 Gm.

Action and Uses.—The same as sodium arsenate. (See *Arsenic* and its compounds.)

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

Sodii Benzoas (*Sodium Benzoate*). *Formula*, $NaC_7H_5O_2 = 143.01$. —A white, amorphous, granular, or crystalline powder, made by adding sodium bicarbonate to benzoic acid suspended in water, evaporating and granulating. It is odorless, has a sweetish, astringent taste, is permanent in air, and *soluble* in 1.6 parts of water, and 43 parts of alcohol. Its aqueous solution is neutral or slightly alkaline to litmus paper.

Action and Uses.—When taken internally, sodium benzoate is decomposed in the tissues and eliminated in the urine as hippuric acid, rendering that secretion more strongly acid than normal, or neutralizing any abnormal alkalinity of the urine. It is administered internally in the treatment of *phosphaturia*. It may be *dispensed* in powders capsules, cachets, or in aqueous solutions.

Incompatibilities.—The salt is decomposed by mineral acids, liberating benzoic acid. It precipitates the salts of iron, lead, silver, mercury, quinine sulphate, and quinine bisulphate.

Dose.—0.6 to 2 Gm.; 10 to 30 grains.

Sodii Bicarbonas (*Sodium Bicarbonate*). *Formula*, $NaHCO_3 = 83.43$. —A white, opaque powder; permanent in dry air, but slowly decomposed in moist air. It may be made either by treating sodium bicarbonate with carbon dioxide, or by passing carbon dioxide into a solution of sodium chloride in ammonia water, collecting and washing the precipitate. Sodium bicarbonate, when pure, is odorless, has a cooling, mildly alkaline taste, gives a slightly alkaline reaction to cold water, the alkalinity increasing by agitation, prolonged standing or heating. It is *insoluble* in alcohol, is *soluble* in 12 parts of water at 15° C. (59° F.), but at a higher temperature the solution gradually loses carbon dioxide, and at boiling heat the salt is entirely converted into sodium carbonate. In the dry state, when heated, it is converted into sodium carbonate, and at 100° C. (212° F.) loses 36.5 per cent. of its weight.

Action and Uses.—Sodium bicarbonate, when used either internally or locally, is a safe, efficient, and agreeable *antacid*, and possesses the general medicinal action of alkali carbonates. When pure, it is free from the bitter disagreeable taste of the commercial article. The salt is administered internally to overcome *gastric hyperacidity*, and applied locally to the joints in *acute rheumatism*. It is employed in pharmacy in making the various effervescent salts, and in Seidlitz Powders, and Mixture of Rhubarb and Soda.

Incompatibilities.—Like other bicarbonates and carbonates, it is decomposed and effervesces actively in the presence of acids. When

quite free from sodium carbonate it precipitates many metallic salts and alkaloidal salts from their solution in water, but, if contaminated with the carbonate, it precipitates most of them.

Dose.—0.3 to 4 Gm.; 5 to 60 grains.

Trochisci Sodii Bicarbonatis (*Troches of Sodium Bicarbonate*).—Each troche contains about 3 grains (0.18 Gm.) of Sodium Bicarbonate, combined with Sugar and Myristica, by Mucilage of Tragacanth.

Dose.—One as required.

Sodii Bisulphis (*Sodium Bisulphite*). *Formula*, $NaHSO_3 = 103.35$.—Opaque, prismatic crystals, or a granular powder, made by passing sulphurous acid gas into an aqueous solution of sodium carbonate until saturated, and then crystallizing by evaporation, and, lastly, washing and drying the crystals.

The salt has a disagreeable, sulphurous taste, and its aqueous solution has an acid reaction. When exposed to the air it exhales an odor of sulphur dioxide and is converted into sodium sulphate and carbonate, and should, therefore, be kept in well-filled, glass-stoppered bottles in a cool place. It is *soluble* in 3.5 parts of water, and 70 parts of alcohol.

Action and Uses.—Sodium bisulphite, like the sulphite, is used as an antiferment and antiseptic. In solution, it has been particularly recommended for destroying and preventing fungous growths, and is employed in treating *gastric disorders due to Sarcina ventriculari*s and *Torula cerevisiæ*, and also for *aphthous stomatitis*.

Incompatibilities.—The salt is decomposed by nearly all acids, reduces hypophosphites to phosphates, arsenic compounds to arsenous, and precipitates neutral solutions of the salts of nearly all metals.

It is best *administered* in distilled water without combination.

Dose.—0.3 to 2 Gm.; 5 to 30 grains.

Sodii Boras (*Sodium Borate*). *Synonym*, Borax. *Formula*, $Na_2B_4O_7 + 10H_2O = 379.32$.—Colorless, transparent, monoclinic prisms, or a white powder. It is without odor, has a sweetish, alkaline taste, is slightly efflorescent in warm, dry air, dissolves in 17 parts of water, is insoluble in alcohol, but dissolves freely in warm glycerin. In this country, borax is usually obtained by purifying and crystallizing the impure natural product, found abundantly as a crystalline deposit in certain lakes in California, from deposits in Nevada, and also from calcium borate mined in California.

Action and Uses.—In single medicinal doses, borax probably has very little effect upon the human economy, but in full doses repeated several times a day, and continued for some time, it acts as a depressant, and disturbs both gastric and intestinal digestion. It is a feeble *antiseptic*, and *retards fermentation*, but is not a germicide. The chemical is most extensively used in solution as a cleansing and mild antiseptic wash for discharging mucous membrane, as in *leucorrhœa, otorrhœa, nasal catarrh*, and *stomatitis*.

Incompatibilities.—Sodium borate is decomposed by mineral acids, boric acid being set free; it gives a precipitate with neutral solutions of many metallic salts, such as corrosive mercuric chloride, silver nitrate, lead acetate, barium chloride, calcium chloride, zinc sulphate, alum, and ferric salts.

Glycerin added to an aqueous solution slowly liberates boric acid, the solution becoming acid in reaction if the quantity of borax is small. Sodium borate, being alkaline in reaction, decomposes alkaloidal salts, in aqueous solution setting free the alkaloid, which, being less soluble than the alkaloidal salt, usually precipitates; glycerin added to the solution prevents the precipitation. Borax coagulates mucilage of acacia, and decomposes hydrated chloral. When triturated in the dry state with alum, benzoic, gallic, salicylic, or tartaric acid it gives a damp mass. It increases the solubility in water of boric, benzoic, and salicylic acids.

Dose.—0.3 to 1 Gm.; 5 to 15 grains.

Sodii Bromidum (*Sodium Bromide*). *Formula*, NaBr = 102.24.—Colorless, or white, cubical crystals, or a white, granular powder. The salt is without odor, has a saline, slightly bitter taste, absorbs moisture from the air without deliquescing, dissolves in 1.7 parts of water and 12.5 parts of alcohol. Its aqueous solution (1 in 20) is neutral or shows a faintly alkaline reaction with red litmus paper.

The chemical may be obtained by decomposing ferrous bromide by sodium carbonate.

Action and Uses.—The action, uses, and incompatibilities of this salt are similar to other alkali bromides. (See *Bromides*.) It is somewhat stronger in bromine than is potassium bromide.

Dose.—0.5 to 4 Gm.; 5 to 60 grains.

Sodii Carbonas Monohydratus (*Monohydrated Sodium Carbonate*). *Formula*, $Na_2CO_3 + H_2O = 123.19$.—A white, crystalline, granular powder, free from odor, and having a strongly alkaline taste and reaction. When exposed to air under ordinary conditions, it absorbs only a small per cent. of moisture, but if the air is warm (50° C. (122° F.) or above) and dry, the salt effloresces, and at 100° C. (212° F.) it loses its water of crystallization (14.52 per cent.).

Monohydrated sodium carbonate is obtained by crystallization and granulation from a concentrated solution of sodium carbonate, commonly known as *Sal soda*, at a temperature above 35° C. (95° F.). The monohydrated salt contains less than 15 per cent. of water of crystallization, whereas ordinary sodium carbonate contains 63 per cent. of water of crystallization, effloresces, and therefore makes calculation more difficult when it is intended to use exact quantities of the alkali.

Sal soda may be made either by the historic Leblanc process of acting upon sodium chloride with sulphuric acid to form the sulphate, and then decomposing the sulphate thus obtained by calcium carbonate and charcoal at a high temperature; or by heating cryolite, a double fluoride of

aluminum and sodium, with chalk to form sodium aluminate, which in solution is treated with carbonic acid gas to form sodium carbonate.

Action and Uses—Monohydrated sodium carbonate is strongly alkaline, and, in overdoses and in concentrated form, acts as a corrosive poison. The salt is rarely used internally, but is employed in manufacturing many of the sodium salts. If desired, it may be dissolved in water, well diluted, and used internally as an antacid in treating *gastric hyperacidity*, and *excessive acidity of the urine*. It is antidoted by weak acids, such as orange-juice, lemon-juice, and vinegar, followed by bland oils, mucilage, and milk to soothe the irritated mucous membranes.

Incompatibilities.—This strongly alkaline salt is decomposed with effervescence by acids; precipitates many metallic salts and alkaloidal salts from their solution in water.

Dose.—0.3 to 0.6 Gm.; 5 to 10 grains.

Sodii Chloras (*Sodium Chlorate*). *Formula*, $NaClO_3 = 105.70$.—Colorless, transparent crystals, or a crystalline powder, free from odor, having a cooling, saline taste, and a neutral reaction. It is permanent in dry air, much more freely *soluble* in water than is potassium chlorate, dissolving in 1 part of water, 100 parts of alcohol, and about 5 parts of glycerin. In the dry state, if added to hydrochloric acid, it evolves chlorine. When heated, it melts and gives off about 45 per cent. of its weight of oxygen. It is a powerful oxidizer, and dangerous explosions are liable to occur when heated or triturated with organic substances, such as sugar, cork, tannic acid, or with readily oxidizable substances, such as sulphur, sulphides, or phosphorus. If, for any reason, it is desired to mix it with any of these or similar substances in the dry state, the salt and the substance should be powdered separately and mixed gently with a spatula on a pill tile or ointment slab.

The salt may be obtained by double decomposition between potassium chlorate and sodium bitartrate.

Action and Uses.—Sodium chlorate, if taken internally, is absorbed and eliminated by the mucous membranes and kidneys unchanged. In *overdoses*, it is a renal irritant, and decomposes the blood, changing it to a chocolate color. Like potassium chlorate, it is used as a gargle and mouth wash in treating *inflammation* and *ulceration* of the *mouth*, *gums*, and *pharynx*, and by irrigation to relieve *acute inflammation of the rectum*. Sodium chlorate possesses the advantage of being more soluble than potassium chlorate and less depressing.

Dose.—0.12 to 0.6 Gm.; 2 to 10 grains.

Sodii Chloridum (*Sodium Chloride*). *Synonym*, Salt. *Formula*, NaCl = 58.06.—Sodium chloride, or common salt, in its purest official form, is seen in colorless, transparent, cubical crystals, or a white crystalline powder, free from odor and having a purely saline taste. If free from contaminating salts, it is permanent in dry air; *soluble* in 28 parts of water at the ordinary temperature, and in 2.5 parts of boiling water, and almost insoluble in alcohol. In solution, it is neutral to litmus paper.

Salt is obtained from mines, or by evaporating sea water, but requires purification to free it from all impurities, so as to make it suitable for medicinal use.

Action and Uses.—Salt as a food is essential to the human economy; it maintains the normal alkalinity of the blood and other fluids of the tissues, and is the source from which hydrochloric acid of the gastric juice is elaborated. In full doses, it is a purge; and in large doses, an emetic. A sterilized warm solution in distilled water of the strength of from 0.6 to 0.7 per cent. (45 to 50 grains to the pint) has about the same osmotic pressure as the blood; such a solution is known as "physiological salt solution," or "normal salt solution," and is frequently used by transfusion, hypodermoclysis, or by colonic injection to replace blood lost by hemorrhage. Similar solutions are also employed as a wash for catarrhal mucous membranes, as in *nasal catarrh, conjunctivitis, leucorrhœa,* and *otitis media.* Salt is the most readily obtainable and efficient *chemical antidote* to *nitrate of silver.*

Incompatibilities.—Soluble lead, silver, and mercurous salts are precipitated from solution by the addition of sodium chloride.

Dose.—As an emetic and purge, 8 to 16 Gm.; 2 to 4 ʒ.

Sodii Citras (*Sodium Citrate*). *Formula,* $2Na_3C_6H_5O_7 + 11H_2O = 709.20$. —A white, granular powder, without odor, and having a cooling, saline taste. Upon exposure to dry air, it slowly effloresces, is *soluble* in 1.1 parts of water, its aqueous solution being slightly alkaline, and is only slightly soluble in alcohol. It is made by adding sodium carbonate to a solution of citric acid, evaporating, and granulating.

Action and Uses.—Sodium citrate, like potassium citrate, when taken internally, circulates in the blood and is eliminated as a carbonate, thereby increasing the alkalinity of the blood and reducing the normal acidity of the urine. It is employed as an expectorant in *acute bronchitis,* in *acute rheumatism,* to overcome *excessive acidity of the urine,* and as an alkaline diuretic in *acute, sthenic fevers.* It is best *administered* in aqueous liquids, but, if desired, may be prescribed in powders or capsules.

Incompatibilities.—Like all salts of weak acids it is decomposed by mineral acids; in watery solution, it decomposes hydrated chloral, resulting in the formation of chloroform; it increases the solubility in water of salicylic, gallic, and benzoic acids.

Dose.—0.6 to 2 Gm.; 10 to 30 grains.

Sodii Hydroxidum (*Sodium Hydroxide*). *Synonym,* Caustic Soda. *Formula,* $NaOH = 39.76$.—Dry, white flakes, fused masses, or translucent or opaque-white pencils, containing not less than 90 per cent. of pure anhydrous Sodium Hydroxide. It is odorless, has a caustic taste, and a strongly alkaline reaction; upon exposure to the air, it rapidly deliquesces, absorbs carbon dioxide, becoming covered with a dry coating of sodium carbonate; it is *soluble* in 1 part of water, and also very soluble in alcohol. The substance is destructive to animal tissues, neutralizes acids, and saponifies fixed oils, fats, and resins.

It may be made by decomposing metallic sodium by adding it to water, and evaporating the solution of sodium hydroxide thus formed to dryness; or by boiling a solution of sodium carbonate with sodium hydroxide, decanting the liquid, evaporating it to dryness, fusing the mass thus obtained, and pouring into moulds to cool.

Action and Uses.—Sodium Hydroxide is actively destructive to the animal tissues, and is occasionally used as a cauterizing agent. Great care must be observed in handling and applying it. The substance is used in making Solution of Sodium Hydroxide.

Liquor Sodæ Chlorinatæ (*Solution of Chlorinated Soda*). *Synonym,* Labarraque's Solution.—A clear, pale, greenish solution, containing not less than 2.4 per cent., by weight, of available chlorine, made by double decomposition between a mixture of Chlorinated Lime and a solution of Monohydrated Sodium Carbonate.

Used as a disinfectant. (See *Chlorine Compounds.*)

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

Liquor Sodii Hydroxidi (*Solution of Sodium Hydroxide*). *Synonym,* Liquor Sodæ.—A clear, colorless, aqueous liquid, containing about 5 per cent. of anhydrous Sodium Hydroxide (NaOH), made by dissolving 5.6 per cent. of sodium hydroxide in distilled water. The solution is free from odor, has a very acrid and caustic taste, and a strongly alkaline reaction. It saponifies fixed oils, fats, and resins, and makes them soluble in water.

Action and Uses.—Locally, the solution has a caustic action upon the tissues. When well diluted in water or milk and administered internally in medicinal doses it is an antacid, being used to overcome *gastric hyperacidity,* and *excessive acidity of the urine.* When *administered* it should be *freely* diluted with water or milk.

Poisonous Action.—If taken internally without dilution, it exerts its powerful caustic action upon the lips, within the mouth, œsophagus, and stomach; death may follow quickly from gastric perforation, or there may develop the usual symptoms of an irritant, caustic poison. There is an acrid, burning taste in the mouth, throat, œsophagus, and stomach; the voice is hoarse; the tongue and tissues of the mouth are corroded and swollen; there is vomiting of blood and mucus, pain over the abdomen, diarrhœa, and general circulatory depression.

Treatment of Poisoning.—On account of its destructive influence upon the walls of the stomach when a concentrated solution of sodium hydroxide is swallowed, emetics should not be administered, nor the stomach tube used, as these measures are liable to lead to gastric perforation. The alkali should be neutralized by administering vegetable acids, such as orange-juice, lemon-juice, a solution of citric acid, or vinegar; bland fixed oils, such as castor, linseed, olive, or almond oil, and mucilage of acacia should be administered to soothe the inflamed mucous membranes.

Incompatibilities.—Solution of sodium hydroxide is incompatible with acids, acid salts, alkaloidal salts, ammonium salts, hydrated chloral,

and phenyl salicylate, the soluble salts of nearly all the metals except arsenic.

Dose.—0.3 to 1 Cc.; 5 to 15 minims.

Sodii Hypophosphis (*Sodium Hypophosphite*). *Formula*, $NaPH_2O_2 + H_2O = 105.29$.—Small, colorless, transparent, rectangular plates, of a pearly luster, or a white, granular powder, usually made by the process of double decomposition between calcium hypophosphite and sodium carbonate. It is odorless, has a bitterish-sweet, saline taste, is neutral, or slightly alkaline in reaction, is very deliquescent in moist air, *soluble* in about 1 part of water, and 25 parts of alcohol. When heated in a test-tube, it loses its water of crystallization, and at about 200° C. (392° F.) is decomposed, evolving hydrogen and hydrogen phosphide, which burns spontaneously with a bright yellow flame. When heated or triturated with nitrates, chlorates, or other oxidizing agents, it is liable to explode. It must be kept in well-stoppered bottles.

Action and Uses.—Like other hypophosphites, this chemical is used in the early stages of *wasting diseases*, and enters into the composition of the Compound Syrup of Hypophosphites. Being deliquescent, it cannot be given in pills or capsules, but must be *dispensed* in solution.

Dose.—0.3 to 1 Gm.; 5 to 15 grains.

Sodii Iodidum (*Sodium Iodide*). *Formula*, NaI = 148.78.—Colorless, cubical crystals, or a white, crystalline powder. It is odorless, has a saline and slightly bitter taste, and is slightly alkaline in reaction. The salt deliquesces in moist air, decomposes, and assumes a brownish tint. It is *soluble* in 0.5 part of water, and in about 3 parts of alcohol.

Sodium iodide may be made by treating an aqueous solution of sodium hydroxide with iodine, evaporating almost to dryness, mixing with powdered charcoal, drying, and subjecting the mass to red heat, lixiviating and concentrating the solution thus obtained and setting aside to crystallize. It may also be made by double decomposition between ferrous iodide and sodium carbonate.

Action and Uses.—The action, uses, and incompatibilities of sodium iodide are about the same as those of the other alkali iodides. (See *Iodides.*)

Being deliquescent upon exposure to moist air, and freely soluble in water, it is best *prescribed* in aqueous liquids.

Dose—0.3 to 2 Gm.; 5 to 30 grains.

Sodii Nitras (*Sodium Nitrate*). *Formula*, $NaNO_3 = 84.45$.—Colorless, transparent, rhombic crystals, free from odor, having a cooling, saline, and slightly bitter taste, and a neutral reaction. It is hygroscopic in moist air, *soluble* in 1.1 parts of water, and about 100 parts of alcohol. When heated above 312° C. (593.6° F.) it evolves oxygen, and when heated with charcoal the mixture deflagrates. The salt is obtained by purification from a natural sodium nitrate found in rainless districts of Chile.

Action and Uses.—If swallowed in concentrated form, sodium nitrate acts as an irritant corrosive poison, and gives rise to gastro-enteritis. It is rarely employed internally as a *diuretic* and *diaphoretic.*

Dose.—0.3 to 1 Gm.; 5 to 15 grains.

Sodii Nitris (*Sodium Nitrite*). *Formula,* $NaNO_2 = 68.57$.—Sodium nitrite is official in the form of white, or nearly white, opaque, fused masses, or pencils, or colorless, transparent, hexagonal crystals. It is free from odor, has a saline taste, a slightly alkaline reaction, deliquesces upon exposure to air, and is *soluble* in 1.4 parts of water, and only slightly soluble in alcohol. At a red heat the salt is decomposed, yielding oxygen, nitrogen, nitrogen dioxide, and sodium oxide. The salt is obtained by heating sodium nitrate with starch or lead, lixiviating the mass with water, purifying, and crystallizing.

Action and Uses.—Sodium nitrite, like other nitrites, exerts its dominant action on the vasomotor system, depressing it, and also the muscular coats of the bloodvessels, thereby markedly lowering blood pressure. In full medicinal doses, it gives rise to flushing of the face, vertigo, and temporal throbbing. Its action is almost identical with other nitrites, but, being more slowly absorbed and also more slowly eliminated than amyl nitrite or nitroglycerin, its effects are more slowly manifested, but longer continued than those substances. It is used in treating *arteriofibrosis, angina pectoris,* and as a *diuretic.* The salt is best *dispensed* in aqueous solution or hermetically closed capsules. It is used in making Spirit of Nitrous Ether.

Incompatibilities.—In acid solution, sodium nitrite decomposes hypophosphites, iodides, ammonium bromide, mercurous salts, permanganates, chromates, antipyrine, acetanilide, acetphenetidin. With sulphuric acid and alcohol it forms ethyl nitrite, a reaction which is taken advantage of in making the official spirit of nitrous ether.

Dose.—0.06 to 0.12 Gm.; 1 to 2 grains.

Sodii Phenolsulphonas (*Sodium Phenolsulphonate*). *Synonym,* Sodium Sulphocarbolate. *Formula,* $NaC_6H_5O_4S + 2H_2O = 230.45$. Sodium Phenolsulphonate is official in the form of colorless, transparent, rhombic prisms. It is odorless, has a cooling, saline, bitter taste, and a neutral reaction. It effloresces slightly in dry air, and *dissolves* in 4.8 parts of water, and about 130 parts of alcohol.

The salt may be made by subjecting a mixture of equal parts of sulphuric acid and phenol to a temperature of 55° C. (131° F.) for several days, adding water, then barium carbonate to form barium phenolsulphonate, filtering to separate barium sulphate, decomposing the filtrate by adding sodium carbonate to form sodium paraphenolsulphonate, which is then separated by evaporation and crystallization.

Action and Uses.—Sodium phenolsulphonate was introduced into medicines with the idea of furnishing an antiseptic possessing both the virtues of phenol and sulphuric acid; to act as such, we should naturally expect that, when taken internally or applied locally, it would decompose into its component parts; the chemical is not thus decomposed, and

it probably exerts very feeble antiseptic properties. It has been used locally as a dressing to *infected wounds*, and administered internally as a *gastro-intestinal antiseptic*. The salt may be *dispensed* in powders, pills, capsules, or in aqueous solutions.

Dose.—0.12 to 0.6 Gm.; 2 to 10 grains.

Sodii Phosphas (*Sodium Phosphate*). *Formula*, $Na_2HPO_4 + 12H_2O$ = 355.61.—Large, colorless, monoclinic prisms, or a granular, crystalline salt, made by treating acid calcium phosphate with sodium carbonate. It is odorless, has a cooling, saline taste, effloresces in the air, and gradually loses 2.5 per cent. of water of crystallization. When heated to about 100° C. (212° F.), it loses all its water of crystallization, 60.3 per cent., and at a red heat, is converted into sodium pyrophosphate. An aqueous solution is alkaline in reaction, a matter I believe of importance, as effervescent sodium phosphate is acid in reaction. The chemical is *soluble* in 5.5 parts of water at ordinary temperature, more freely soluble in hot water, and insoluble in alcohol.

Action and Uses.—In addition to its use to supply phosphates to the tissues, it is more frequently employed as a laxative, purgative, and in *duodenal catarrh*. It is best *administered* in hot water before breakfast. For bottle-fed children, small quantities may be given with the milk.

Incompatibilities.—It precipitates the soluble salts of magnesium.

Dose.—4 to 8 Gm.; 1 to 2 ʒ.

Sodii Phosphas Exsiccatus (*Exsiccated Sodium Phosphate*).—A white powder, made by driving off all of the water of crystallization from effloresced sodium phosphate by subjecting it to a temperature of 100° C. (212° F.). It absorbs moisture readily, unless kept in well-stoppered bottles.

Action and Uses.—Its action and uses are similar to those of sodium phosphate, its dose, however, being about sixty per cent. less.

Dose.—1 to 4 Gm.; 15 to 60 grains.

Sodii Phosphas Effervescens (*Effervescent Sodium Phosphate*).—A white, granular powder, containing 20 per cent. of exsiccated sodium phosphate, made by mixing finely powdered sodium phosphate, sodium bicarbonate, and citric acid, heating until the whole becomes uniformly moist, granulating and drying at a moderate temperature. To prevent decomposition, it must be kept dry and in well-stoppered bottles.

Dose.—4 to 16 Gm.; 1 to 4 ʒ.

Liquor Sodii Phosphatis Compositus (*Compound Solution of Sodium Phosphate*).—A colorless, transparent, slightly acidulous liquid, made by dissolving sodium phosphate, sodium nitrate, and citric acid in water Each fluidram represents one dram of uneffloresced sodium phosphate.

The solution furnishes a convenient method for administering sodium phosphate. Being acid in reaction it is not suitable for administering in milk.

Dose.—4 to 8 Cc.; 1 to 2 fʒ.

Sodii Pyrophosphas (*Sodium Pyrophosphate*). *Formula*, $Na_4P_2O_7 + 10H_2O$ = 443.02.—Colorless, transparent, monoclinic prisms, or a

crystalline powder, made by heating sodium phosphate to redness, dissolving the mass thus formed in water, filtering, and crystallizing. It has a cooling, saline, and faintly alkaline taste, is slightly efflorescent in warm air, *dissolves* in 11.5 parts of water, and is insoluble in alcohol.

Action and Uses.—The salt is used for the same purposes, and in the same dose as sodium phosphate, and also in preparing Ferri Pyrophosphate.

Dose.—2 to 4 Gm.; 15 to 60 grains.

Sodii Salicylas (*Sodium Salicylate*). *Formula,* $NaC_7H_5O_3 = 158.89$. —Sodium salicylate is official in the form of a white, microcrystalline powder or scales, or an amorphous, colorless powder, or having not more than a faint pink tinge. It is free from odor, has a sweetish, saline taste, in aqueous solution is slightly acid to blue litmus paper, permanent in air, soluble in 0.8 part of water, and in 5.5 parts of alcohol. It is also *soluble* in glycerin. It is made by the action of salicylic acid upon sodium carbonate.

Action and Uses.—The action and uses of this salt are similar to those of other salicylates. (See *Acidum Salicylicum.*)

Incompatibilities.—Sodium salicylate precipitates the salts of lead, and silver from solution, giving a bluish or violet-red color to solutions of ferric salts, a green color to solutions of copper salts, a yellowish color turning red with solutions of spirit of nitrous ether. It precipitates the aqueous solutions of quinine sulphate, forms a damp mass when triturated with lead acetate, sodium phosphate, ethyl carbamate, and antipyrine, and in concentrated aqueous solutions increases the solubility of volatile oils, resinous substances, phenol, guaiacol, creosote, thymol, menthol, and resorcinol. The salt is decomposed by mineral acids.

Dose.—0.6 to 2 Gm.; 10 to 30 grains.

Sodii Sulphas (*Sodium Sulphate*). *Synonyms,* Glauber's Salt, Horse Salt. *Formula,* $Na_2SO_4 + 10H_2O = 319.91$.—Sodium sulphate is official in the form of granular crystals, or large, colorless, transparent prisms. It is free from odor, has a bitter, saline taste, a neutral reaction, effloresces, and finally loses all of its water of crystallization upon exposure to the air. It is *soluble* in 2.8 parts of water, is insoluble in alcohol, but dissolves in glycerin. The salt is ordinarily obtained as a bi-product in the manufacture of other chemicals or may be made by acting upon sodium carbonate with sulphuric acid.

Action and Uses.—This alkali sulphate, like magnesium sulphate, is an active *purge,* but by reason of being at the same time an irritant and producing griping, is but little used, except in *veterinary medicine.* It is one of the constituents of many of the natural purgative waters. In the absence of magnesium sulphate, it may be employed as an *antidote in acute lead and phenol poisoning.*

Incompatibilities.—Sodium sulphate, like other soluble sulphates and sulphuric acid, precipitates as insoluble sulphates from soluble compounds of lead, barium, strontium, and calcium.

Dose.—4 to 60 Gm.; 1 ℥ to 2 ℨ.

Sodii Sulphis (*Sodium Sulphite*). *Formula*, $Na_2SO_3 + 7H_2O = 250.39$. —Colorless, transparent, monoclinic prisms, usually prepared by saturating a solution of sodium carbonate with sulphurous acid gas, adding to this solution sodium carbonate, evaporating, and crystallizing. The salt is odorless, has a cooling, saline, sulphurous taste, and a neutral, or feebly alkaline reaction. It is efflorescent upon exposure to the air, is *soluble* in 2 parts of water, but sparingly soluble in alcohol.

Action and Uses.—Sodium sulphite is used as an antiseptic and antiferment, particularly for preventing and destroying yeast fungi. It is administered internally in *gastric disorders* due to *sarcina ventriculariis* and *torula cerevisiæ*, and as a mouth wash for *aphthous stomatitis*. It is best *prescribed* in distilled water without combination.

Incompatibilities.—The salt is decomposed by almost all acids, reduces hypophosphites to phosphates, arsenic compounds to arsenous, and precipitates neutral solutions of the salts of nearly all metals.

Dose.—0.6 to 4 Gm.; 10 to 60 grains.

Sodii Thiosulphas (*Sodium Thiosulphate*). *Synonym*, Sodium Hyposulphite. *Formula*, $Na_2S_2O_3 + 5H_2O = 246.46$.—Sodium Thiosulphate, formerly known as Sodium Hyposulphite, is official in the form of colorless, transparent, monoclinic prisms. It is free from odor, has a cooling, afterward bitter taste, a neutral or faintly alkaline reaction, and is permanent in cool, dry air, but effloresces in warm air, and deliquesces slightly in moist air. It is *soluble* in about 0.35 part of water, and insoluble in alcohol.

Aqueous solutions of the salt dissolve many salts of silver, and remove the stain of iodine. Sulphuric or hydrochloric acid added to an aqueous solution of the salt liberates sulphurous acid gas, and precipitates sulphur.

Action and Uses.—Sodium thiosulphate is looked upon as an antiferment of advantage for preventing fermentation of foods, destructive to fungous growths, such as *sarcinæ ventriculi*, and to parasitic growths upon the skin, such as *pityriasis versicolor*. It is also an undoubted remedy as a local application in cases of *ivy poisoning*. The salt is mildly laxative when taken internally. A slightly acidulated aqueous solution of the salt is valuable for *removing vegetable stains*.

Incompatibilities.—Sodium thiosulphate is decomposed by mineral acids, and precipitates from their solution the salts of lead, barium, strontium, and silver nitrate. In the presence of water, it gives a black color with mild mercurous chloride. In acid solution, it reduces iodine to hydriodic acid, chlorates to chlorides, and arsenic salts to arsenous compounds. When triturated with chlorates, nitrates, permanganates, or other powerful oxidizing agents, explosions are liable to occur.

Dose.—1 to 2 Gm.; 15 to 30 grains.

SPARTEINÆ SULPHAS—Sparteine Sulphate

See *Scoparius*.

SPIGELIA—Spigelia

Synonym, Pink Root. *Family,* Loganiaceæ.

Spigelia is the dried rhizome and roots of *Spigelia marilandica,* a perennial herb growing in the rich soil of woods in the United States as far north as Maryland, and as far west as Texas. The rhizome is of oblique or horizontal growth, branched and bent, with cup-shaped scars on its upper surface, and has numerous thin, brittle, light-colored roots on its lower surface. The rhizome, as seen in the shops, is in pieces about $\frac{2}{3}$ to 2 inches (15 to 50 mm.) long, $\frac{1}{8}$ to $\frac{1}{6}$ inch (3 to 4 mm.) thick, dark purplish-brown externally; yellowish internally, with a central pith. It has a somewhat aromatic odor, and a bitter, pungent taste.

The drug contains a bitter principle, *spigeline,* a volatile alkaloid, volatile oil, tannin, resin, etc.

Action and Uses.—Spigelia is an anthelmintic used against *round worms.* It should be *administered* in combination with a rapidly acting purgative, as when absorbed it occasionally acts as a poison, produces dimness of vision, dilatation of the pupils, strabismus, convulsive movements of the face, or general convulsions, progressive muscular weakness, cardiac and respiratory depression. In cases of poisoning by the drug, diffusible stimulants and an active purge should be administered. It is usual to *administer* spigelia in an infusion along with senna and magnesium sulphate, but the only official preparation of it is the fluidextract.

Dose.—4 to 8 Gm.; 1 to 2 ʒ, in infusion.

Official Preparation

Fluidextractum Spigeliæ (*Fluidextract of Spigelia*).—Menstruum, diluted alcohol.

Administered in combination with an active purge.

Dose.—4 to 8 Cc.; 1 to 2 fʒ.

SPIRITUS ÆTHERIS—Spirit of Ether

See *Æther.*

SPIRITUS ÆTHERIS COMPOSITUS—Compound Spirit of Ether

Synonym, Hoffman's Anodyne. (See *Æther.*)

SPIRITUS ÆTHERIS NITROSI—Spirit of Nitrous Ether

Synonym, Sweet Spirit of Nitre.

Spirit of Nitrous Ether is a pale yellowish or faintly greenish colored liquid, containing, when freshly prepared, not less than 4 per cent. of Ethyl Nitrite ($NO.OC_2H_5$).

It is freely miscible with water and alcohol, and has a fragrant, ethereal, and pungent odor free from acidity, a sharp, burning taste, is volatile and inflammable.

When freshly prepared, or after keeping for a time in a cool place, protected from light and air, it is neutral in reaction, but if exposed to light and air it decomposes with the formation of acetic acid, nitrous acid, nitric acid, alcohol, aldehyde, and other products, when it is no longer fit for medicinal use. It is made by acting upon an aqueous solution of sodium nitrite with an aqueous solution of sulphuric acid, separating, washing, and neutralizing the ethyl nitrite thus formed, and dissolving it in alcohol. The liquid should be kept in small, well-stoppered, amber-colored vials, in a cool place remote from lights and fire.

Action and Uses.—Spirit of nitrous ether, like other nitrites, is a vasomotor depressant, thereby lowering arterial pressure; it is also a diuretic, diaphoretic, antispasmodic, and mild sedative to the nervous system.

Its most frequent uses are to promote free diuresis and diaphoresis in the treatment of *acute sthenic fevers,* particularly those affecting children. It should be *administered* in cold water, and, if a diaphoretic action is desired, should be followed by hot drinks. It enters into the composition of Compound Mixture of Glycyrrhiza.

Incompatibilities.—Spirit of nitrous ether is decomposed by alkali-hydroxides. Ammonium bromide is decomposed by it, liberating bromine; it is oxidized to nitric acid by solution of hydrogen dioxide; if even slightly acid, it forms a green solution with antipyrine, a yellow color with acetanilide, a brown-red color with sodium salicylate, a yellowish color with acetphenetidin, and a yellowish color becoming reddish with an aqueous solution of alcohol. With tannic or gallic acid, or preparations containing them in large amounts, old or acidified spirit of nitrous ether effervesces; with tincture of guaiac, it gives a blue color; morphine, thymol, and acetate are chemically altered by it.

Dose.—0.6 to 4 Cc.; 10 to 60 minims.

SPIRITUS GLYCERYLIS NITRATIS—Spirit of Glyceryl Trinitrate, Spirit of Nitroglycerin

Synonym, Spiritus Glonoini.

Spirit of nitroglycerin is a clear, colorless, alcoholic solution, containing 1 per cent., by weight, of glyceryl trinitrate, $C_3H_5(NO_3)_3$.

The spirit has the odor and taste of alcohol, but, as even in small quantities it is likely to give rise to violent headache, caution should be exercised in tasting it. It is neutral in reaction, volatile, inflammable, and freely miscible with alcohol, but when freely diluted with water, becomes cloudy or produces a white, turbid mixture.

If permitted to evaporate, the residue, nitroglycerin, is highly explosive, therefore the utmost care should be observed in handling, packing, and transporting it. If accidentally spilled, it may be decomposed by pouring upon it a solution of potassium hydroxide.

The spirit should be kept in tins, in a cool place, remote from light and fire.

Pure nitroglycerin is made by adding glycerin in small portions to a mixture of 1 part of fuming nitric acid and 2 parts of concentrated sulphuric acid, pouring the whole into cold water so as to precipitate the nitroglycerin which is then collected, by decantation, and washed with an alkaline aqueous solution to free it from an excess of acid. It is a yellowish, or colorless, syrupy liquid, free from odor, having a sweet, pungent, aromatic taste, sparingly soluble in water, freely *soluble* in alcohol, highly and violently explosive. Its explosive properties make it dangerous to keep or handle, and, therefore, the 1 per cent. solution in alcohol was introduced into the *Pharmacopœia* as a convenient and safe preparation for dispensing and administering.

Action and Uses.—Spirit of nitroglycerin, when taken internally, hypodermically, or locally, quickens the heart and dilates the blood-vessels, and also acts as an antispasmodic. In full medicinal doses, it gives rise to vertigo and a throbbing headache. Individuals quickly lose their susceptibility to the drug, so that gradually increasing doses are usually required for those taking the remedy over a long period of time. It is quick in action, but rather fleeting in its effects.

Nitroglycerin is used as a vasomotor dilator in the treatment of *arterial atheroma, angina pectoris, chronic nephritis,* and *asthma.*

It is best *dispensed* in the form of the spirit, of which each minim represents about $\frac{1}{100}$ of a grain of nitroglycerin. Tablets and pills prepared by large manufacturers are kept in stock by all druggists, but are not readily prepared extemporaneously. The dose of pure nitroglycerin is about $\frac{1}{200}$ to $\frac{1}{50}$ grain.

Incompatibilities.—Spirit of nitroglycerin is rendered cloudy or turbid by the addition of water; it is decomposed by alkalies and alkaline carbonates.

Nitroglycerin explodes upon percussion.

Dose.—0.03 to 0.06 Cc. ($\frac{1}{2}$ to 1 minim), to be increased until effects are manifested.

STAPHISAGRIA—Staphisagria

Synonym, Stavesacre. *Family,* Ranunculaceæ.

Staphisagria is the dry seed of *Delphinium Staphisagria,* an annual or biennial herb growing wild in the Mediterranean Basin, and cultivated in France and Italy. The seed is irregularly tetrahedral, convex on one side, $\frac{1}{5}$ to $\frac{1}{4}$ inch (5 to 6 mm.) long, $\frac{1}{8}$ to $\frac{1}{4}$ inch (3 to 6 mm.) broad; externally blackish-brown, becoming light with age, reticulately marked, has only a slight odor, but an intensely bitter and acrid taste.

It contains *delphinine*, its chief alkaloid, which is crystallizable; *delphinoidine*, an amorphous alkaloid; *delphisine*, a crystallizable alkaloid; *staphisagrin*, an amorphous principle; fixed oil; volatile oil.

The drug yields its virtues to boiling water and to alcohol.

Action and Uses.—Staphisagria, when swallowed or absorbed from an abrasion, is highly poisonous, and may produce emesis, catharsis, and stupor. Although it is rarely used internally, the U. S. P. states a dose for the drug, and its official preparation, the fluidextract. The powdered drug incorporated into an ointment, the infusion, or decoction made from the bruised seed, and the fluidextract are employed locally to *destroy vermin* upon the body or head. In applying, caution should be observed not to apply to abraded surfaces.

Dose (U. S. P.)—0.06 Gm.; 1 grain.

Official Preparation

Fluidextractum Staphisagriæ (*Fluidextract of Staphisagria*).—Made with a menstruum of alcohol and water.

Dose (U. S. P.).—0.06 Cc.; 1 minim.

STILLINGIA—Stillingia

Synonym, Queen's Root. *Family*, Euphorbiaceæ.

Stillingia is the dried root of *Stillingia sylvatica*, a perennial herb yielding a milky juice when wounded, growing in the sandy soil and pine barrens of Virginia, Florida, and as far west as Louisiana.

The root is fusiform, subcylindrical; externally, reddish-brown and longitudinally wrinkled. The woody portion is tough, grayish-brown, porous, and radiate. The bark is thick, spongy, finely fibrous and easily separable from the woody portion. The root is usually seen in the shops cut in segments from 2 to 12 inches (50 to 300 mm.) long. It has a distinct odor, and a bitter, acrid, and pungent taste.

Stillingia contains an acrid, pungent resin known as *sylvacrol*, an acrid, volatile oil, which is wholly or in part lost when the drug is long kept, tannin, starch, fixed oil, etc. The drug deteriorates with age.

Action and Uses.—Stillingia in medicinal doses is an alterative, diuretic, diaphoretic, sialagogue, local stimulant to mucous membranes, and mild circulatory sedative. In large, or overdoses, it is an emetic and purgative. The drug is used as a stimulant to the mucous membrane in treating *subacute* and *chronic gastric* or *intestinal indigestion*, and as an alterative in *secondary syphilis* and *chronic glandular tuberculosis*. Much of the drug and many preparations made from it found in the shops are almost inert.

Dose.—0.6 to 4 Cc. (10 to 60 grains), in decoction.

Official Preparation

Fluidextractum Stillingiæ (*Fluidextract of Stillingia*).—Menstruum, diluted alcohol.

Dose.—0.6 to 4 Cc.; 10 to 60 minims.

STRAMONIUM—Stramonium

Synonym, Jamestown Weed. *Family,* Solanaceæ.

Stramonium is the dried leaves of *Datura Stramonium,* commonly known as Jamestown Weed, or Jimson Weed, a coarse annular herb, indigenous to Asia, but naturalized in Europe and North America, and grows wild in neglected lots and fields, waysides, and other waste places near houses.

The leaves are 4 to 10 inches (100 to 250 mm.) long, 3 to 6 inches (75 to 150 mm.) broad; dark green or grayish-green, lighter beneath; shortly petiolate, inequilaterally ovate, acuminate oblique at the base, coarsely incised, and, when dry, is thin, brittle, wrinkled, and matted. When dry, they have little or no odor, but when moist, their odor is distinct, heavy, and narcotic. Their taste is slightly bitter and nauseous.

The drug contains *daturine,* which in reality is a mixture of the alkaloids atropine and hyoscyamine. It should yield not less than 0.25 per cent. of mydriatic alkaloids.

Action and Uses.—Stramonium does not differ materially in its action or uses from belladonna leaves. (See *Belladonna.*) The drug and preparations made from it contain a lower per cent. of mydriatic alkaloids than belladonna leaves, and its preparations should, therefore, be administered in somewhat larger doses than that drug and preparations made from it.

Dose.—0.06 to 0.3 Gm.; 1 to 5 grains.

Official Preparations

Extractum Stramonii (*Extract of Stramonium*).—A *pilular extract* made by evaporating fluidextract of stramonium. When assayed according to the U. S. P. process, it should contain 1 per cent. of mydriatic alkaloids from stramonium.

Dose.—0.01 to 0.02 Gm.; $\frac{1}{6}$ to $\frac{1}{3}$ grain.

Fluidextractum Stramonii (*Fluidextract of Stramonium*).—Menstruum, alcohol, 2 parts, and water, 1 part. Each 100 Cc. should contain 0.25 Gm. of mydriatic alkaloids from stramonium.

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

Tinctura Stramonii (*Tincture of Stramonium*).—Made by percolating 10 Gm. of powdered Stramonium with Diluted Alcohol to

make 100 Cc. of tincture. Each 100 Cc. should contain 0.025 Gm. of mydriatic alkaloids from stramonium.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

Unguentum Stramonii (*Stramonium Ointment*).—Made by rubbing 10 Gm. of Extract of Stramonium with 5 Cc. of Diluted Alcohol, and incorporating with 20 Gm. of Hydrous Wool-Fat and 65 Gm. of Benzoinated Lard.

Used locally.

STRONTIUM SALTS

Formula, Sr = 86.94.

While several of the salts of strontium are official, the metal itself, which is only produced in a small way by electrolysis, has no medicinal use. It is yellow, malleable, about the hardness of lead, and is so readily oxidized that it must be kept under naphtha. The official salts are the *bromide*, *iodide*, and *salicylate*, all useful on account of the positive element with which the strontium is combined.

The salts of strontium are liable to be contaminated by barium, which interferes with their therapeutic properties. The official salts are soluble in water and in alcohol, although the salicylate is less soluble in the last named liquid than the others; they are precipitated from solution by soluble carbonates, phosphates, sulphates, alkali hydroxides, and chromates.

Official Strontium Salts

Strontii Bromidum (*Strontium Bromide*). *Formula*, $SrBr_2 + 6H_2O$ = 352.94.

Strontium bromide is official as colorless, transparent, hexagonal crystals. It is free from odor, has a bitter saline taste, a neutral reaction, is very deliquescent, and *dissolves* freely in water and alcohol. Much of the strontium bromide in the market was formerly contaminated by an excess of barium compounds, but strontium salts now made in this country and found in the shops are quite as pure and free from barium as the more expensive imported salts.

Strontium bromide may be made by dissolving strontium carbonate in a solution of hydrobromic acid, concentrating, and crystallizing.

Action and Uses.—The action, uses, and untoward effects of the salt are quite similar to those of the other soluble bromides. (See *Bromides*.) It has been somewhat more extensively used in the treatment of *nervousness associated with gastric disorders* than the other bromides.

By reason of its deliquescent character, the salt should be *dispensed* in solution.

Incompatibilities.—In addition to the usual incompatibilities of the bromides (see *Bromides*), it is precipitated from solution by carbonates, sulphates, chromates, and alkali hydroxides.

Dose.—0.3 to 2 Gm.; 5 to 30 grains.

Strontii Iodidum (*Strontium Iodide*). *Formula*, $SrI_2 + 6H_2O$ = 446.02.

The salt is official in colorless, transparent, hexagonal plates, or a white, granular powder, or crystalline crusts. It is odorless, has a bitter, saline taste, is neutral in reaction, deliquesces, and becomes yellow, showing free iodine upon exposure to air, is *soluble* in about 0.5 part of water and also dissolves in alcohol. It may be obtained by acting on a solution of strontium hydroxide with hydriodic acid, and evaporating.

Action and Uses.—The action and uses of this salt do not differ materially from those of the alkali *iodides*. It is claimed that it is neither irritating nor depressing, and is used as an alterative in *syphilis*, *rheumatism*, and other diseased conditions for which the alkali iodides are administered. (See *Iodine*.) It is somewhat less stable than the alkali iodides, and caution should be observed not to use the salt when it has decomposed and is contaminated by free iodine. Being deliquescent, it should be *prescribed* in solution. Formerly difficult to obtain free from contamination with barium, the domestic salt is now marketed quite pure, and free from that chemical.

Incompatibilities.—In addition to the incompatibilities of the iodides in general (see *Iodides*), strontium iodide is precipitated by soluble sulphates, chromates, soluble phosphates, soluble carbonates, and the alkali hydroxides.

Dose.—0.3 to 2 Gm.; 5 to 30 grains.

Strontii Salicylas (*Strontium Salicylate*). *Formula*, $Sr(C_7H_5O_3)_2 + 2H_2O = 394.72$.

This salicylate is seen as a white, crystalline powder, without odor, and having a sweetish, saline taste, and a slightly alkaline reaction. It *dissolves in* 18 parts of water, and 66 parts of alcohol. Formerly difficult to obtain free from decided contamination by barium, the domestic salt is now readily obtainable quite pure. It may be obtained by decomposing strontium carbonate with a hot concentrated solution of salicylic acid, filtering, and crystallizing.

Action and Uses.—The action and uses of this salicylate do not differ materially from the alkali salicylate, except that it is considered less likely to disorder digestion. (See *Salicylates*.) It is used principally in the treatment of *rheumatism*. The salt may be *dispensed* in powders, capsules, tablets, or solutions.

Incompatibilities.—In addition to the incompatibilities of the salicylates (see *Acidum Salicylicum*), the salt is incompatible with soluble sulphates, soluble carbonates, soluble phosphates, and chromates, and the alkali hydroxides.

Dose.—0.3 to 2 Gm.; 5 to 30 grains.

STROPHANTHUS—Strophanthus

Synonym, Kombé Arrow Poison. *Family*, Apocynaceæ.

Strophanthus is the ripe seed, deprived of its long awn (bearded hair), of *Strophanthus Kombé*, a large climbing plant indigenous to eastern Africa.

The fruit of the vine is a large pair of follicles, pods, or capsules, about 8 to 15 inches (20 to 37 cm.) long, each enclosing numerous long, awned seeds.

The seed is $\frac{2}{3}$ to 1 inch (15 to 25 mm.) long, $\frac{1}{6}$ to $\frac{1}{5}$ inch (4 to 5 mm.) broad, pointed at each extremity, sharply and suddenly narrowed at its apex, and somewhat rounded at its base, flattened at its sides, and having a keel-shaped ridge upon one side, slightly twisted from its apex to its base; light brown colored, with a distinct greenish tinge; silky lustrous from a coating of short hairs; odor slight when dry, and heavy when crushed and moistened; taste, very bitter.

The drug depends for its medicinal properties upon a crystallizable glucoside *strophanthin.*

Action and Uses.—In medicinal doses, strophanthus, its glucoside, and preparations stimulate the heart muscle, thereby increasing the volume, force, and tension of the pulse. It is used solely as a cardiac stimulant, in diseased conditions dependent upon *cardiac weakness.* In medicinal doses, it occasionally produces *intestinal pains* and *diarrhea.* In *overdoses,* the drug is strongly toxic. The drug, its glucoside, and preparations deteriorate in water, and should, therefore, not be *prescribed* in combination with this liquid, nor in highly aqueous liquids.

Official Preparation and Derivative

Tinctura Strophanthi (*Tincture of Strophanthus*).—Made by percolating 10 Gm. of Strophanthus with a menstruum of Alcohol, 65 parts, and Water, 35 parts, to make 100 Cc. of tincture.

Dose.—0.2 to 0.5 Cc.; 3 to 8 minims.

Strophanthinum (*Strophanthin*).—A white, or faintly yellowish, *crystalline* powder, consisting of a glucoside or a mixture of glucosides from strophanthus. It is permanent in air, freely *soluble* in water and diluted alcohol, less soluble in absolute alcohol, and neutral in reaction. It is important to note that only *crystalline* strophanthin is official, as the amorphous glucoside or mixture of glucosides are not uniform in strength.

This powerful alkaloid, employed as a heart stimulant, should be used with caution, as in overdoses it is highly toxic.

Dose.—0.0003 to 0.0006 Gm.; $\frac{1}{200}$ to $\frac{1}{100}$ grain.

STRYCHNINA—Strychnine

For strychnine, its salts and compounds, see *Nux Vomica.*

STYRAX—Storax

Family, Hamamelidaceæ.

Storax is a semiliquid, grayish, sticky balsam, obtained from the wood and inner bark of *Liquidambar orientalis,* a tree 40 to 50 feet high,

resembling our sweet-gum, growing in Asia Minor. The balsam is an opaque, semiliquid mass, translucent in thin layers, and deposits a heavy brown stratum upon standing. It has an agreeable odor, a balsamic taste, is *insoluble* in water, and *soluble* in alcohol, its solution being acid in reaction. It imparts its odor to warm oils and fats, in which some of its constituents are soluble. The drug contains *cinnamic acid*, *benzoic acid*, *storesin*, *styrol*, *ethyl cinnamate*, and a resinous substance.

Action and Uses.—Storax, when administered internally, is a mild stimulating expectorant, and also a stimulant and feeble antiseptic to the genito-urinary tract. It is useful in *subacute bronchitis*, and *cystitis*. The vapor arising from adding storax to boiling water is inhaled to relieve *acute colds* of the upper respiratory tract. Storax, suspended in warm oils, lard, or other fats, gives up benzoic and cinnamic acids, which act as a preservative, and imparts to them an agreeable odor. The balsam is very similar to benzoin in its action and uses. It is one of the ingredients of Compound Tincture of Benzoin. It may be *administered* in pills, capsules, emulsions, or alcoholic solutions.

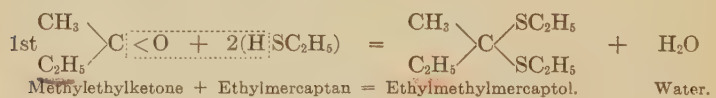
Dose.—0.6 to 1.2 Gm.; 10 to 20 grains.

SULPHONETHYLMETHANUM—Sulphonethylmethane

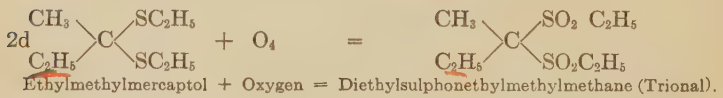
Synonym, Trional. *Formula*, $(CH_3)(C_2H_5)C(SO_2C_2H_5)_2 = 240.46$.

Diethylsulphonemethylethylmethane, commonly known as trional, a synthetic compound, is an oxidation product of mercaptol, obtained by the condensation of methylethylketone and with ethylmercaptan. It is made by bringing about a reaction between a mixture of methylethylketone and ethylmercaptan by passing through it to saturation a stream of hydrochloric acid gas to form ethylmethylmercaptol, which in turn is oxidized by treating it with a weak solution of potassium permanganate. It is then purified by repeated crystallization from solutions in boiling water.

The reaction takes place in two parts as follows:



Methylethylketone + Ethylmercaptan = Ethylmethylmercaptol. Water.



Ethylmethylmercaptol + Oxygen = Diethylsulphonethylmethylmethane (Trional).

The chemical appears in colorless, shining, odorless, crystalline scales, which, in aqueous solution, has a faintly bitter taste. It is permanent in air, dissolves but sparingly (1 in 195 parts) in cold water, but is *soluble* in hot water, from which it precipitates upon cooling; it dissolves readily in alcohol. Its aqueous solution is neutral to litmus paper.

Action and Uses.—Sulphonethylmethane depresses the intellectual areas of the brain, and thereby induces sleep, but in single medicinal doses has little or no effect upon the spinal cord, nerves, respiration, circulation, or blood. When frequently repeated or administered over long periods of time, it may disorganize the blood, eliminate hematoporphyrin in the urine, giving it a port-wine color; induces anemia, bringing about a chain of symptoms closely resembling profound neurasthenia. Enormous single doses have been followed by profound narcosis and ultimate recovery, although death has, in a few instances, been attributed to acute poisoning by the drug. Trional is used in treating *insomnia;* it may be *prescribed* in powders to be taken in hot water, in capsules, or mucilaginous mixtures, but on account of its sparing solubility in water, is not suitable for prescribing in aqueous liquids or compressed tablets. Its *hypnotic* effect is more prompt and satisfactory when dissolved in hot water and sipped before cooling.

Incompatibilities.—It is incompatible in powdered form with hydrated chloral, with which, when triturated, it forms a liquid.

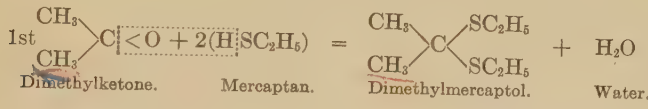
Dose.—0.6 to 2 Gm.; 10 to 30 grains.

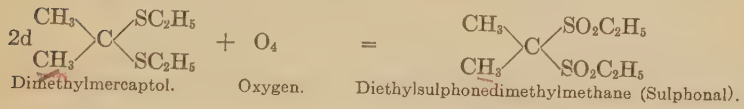
SULPHONMETHANUM—Sulphonmethane

Synonym, Sulphonal. *Formula*, $(CH_3)_2.C.(SO_2C_2H_5)_2 = 226.55$.

The synthetic compound diethylsulphonedimethylmethane is closely allied to trional, being the product of the oxidation of dimethylmercaptol by the condensation of *acetone* (dimethylketone) with ethyl mercaptan, and purified by repeated crystallization from its solution in boiling water.

The reaction takes place in two parts as follows:

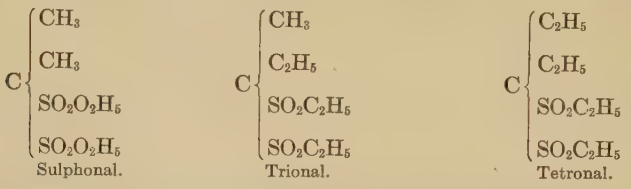




It appears in colorless, odorless, tasteless, prismatic crystals, or a crystalline powder. It is sparingly soluble in cold water, 360 parts being required to dissolve one part of the chemical. It dissolves more freely in hot water, which upon cooling deposits a large part of the compound. It also dissolves in 47 parts of alcohol, 45 parts of ether, 16 parts of chloroform, and in benzene. Its aqueous solution is neutral to litmus paper.

Incompatibilities.—The chemical resists the action of acids, alkalies, and oxidizing agents, but liquefies when triturated with hydrated chloral.

The close chemical relation existing between sulphonmethane, sulphonethylmethane, and sulphonmethylmethane (unofficial), known as tetronal, is shown by the following comparison of chemical formulæ:



Action and Uses.—Sulphonmethane is a hypnotic of value in *insomnia* not due to pain. It is similar in action and uses to sulphonethylmethane.

Dose.—0.6 to 2 Gm.; 10 to 30 grains.

SULPHUR

Native sulphur is generally obtained from preëxisting and present volcanic regions. While extensively supplied to the world from Italy and other countries bordering on the Mediterranean, in America it is now chiefly obtained from Louisiana, California, and Utah. Sulphur beds are on the surface of the earth as well as under ground, but the latter are far more important, and yield almost all of the commerical sulphur. Another commercial source is from its chemical combination with iron and copper, known as *iron* and *copper pyrites*, both of which are native sulphides of these metals. Sulphur in chemical combination is widely distributed in nature, in minerals and mineral waters as sulphides and sulphates, and also in animal and vegetable tissues. It is one of the constituents of oil of mustard, of eggs, and of the albumin of our tissues. Many of the disagreeable odors which arise from decomposing animal and vegetable matter are the result of the hydrogen sulphide set free during the process of putrefaction.

To obtain sulphur from the earths or ores bearing it, they are mixed with fuel, suspended over pits dug in the earth and ignited. During this process a part of the sulphur burns and a part melts and collects in the pit. This crude sulphur may be further purified by melting it in iron pots and dipping off the melted sulphur from the earth and other gross impurities which settle to the bottom of the container. This form of sulphur, by reason of being cooled in cylindrical moulds, is usually seen in rolls, and is commonly known as *brimstone*, or *rolled sulphur*. To obtain it in a still greater state of purity, sulphur earth, crude sulphur, or brimstone, may be placed in a cast-iron still within a brick furnace so arranged that the vaporized sulphur may be condensed in the form of a powder. In this latter form it is known as *Sublimed Sulphur*, or *Flowers of Sulphur*. Sulphur obtained from sulphur-bearing earth is usually free from arsenic, but that derived from pyrites is almost invariably contaminated by arsenical compounds.

Sulphur is a non-metallic element, and is obtainable in the amorphous and at least *six crystalline* forms. Native sulphur, and that deposited from its solution in carbon disulphide, is in *rhombic, octohedral crystals; prismatic* or *monoclinic* prisms are formed after fused sulphur has been permitted to cool. Under peculiar conditions at least four other crystalline forms are known to exist.

Amorphous sulphur is obtained when sulphur is melted at or above 205° C. (482° F.), and poured into cool water. In this form it is a soft, tenacious, rubber-like mass, but after a few hours becomes brittle and changes to the rhombohedral crystalline form.

Heat has a peculiar action upon sulphur: at 115° C. (237° F.) it melts, becoming a mobile *liquid;* at or about 300° C. (572° F.) it becomes *viscid,* so that it cannot be poured, but if heated still higher, to the temperature of about 448° C. (838.4° F.), it again *liquefies* and *boils,* giving off a yellow *vapor.*

Sulphur is inflammable, and, in the air, burns with a blue flame and gives off sulphur dioxide. It is *insoluble* in water, only *slightly soluble* in absolute alcohol, *readily soluble* in carbon disulphide, also dissolves in petroleum benzin, benzene, oil of turpentine, and many other oils, in ether, chloroform, and boiling aqueous solution of the alkali hydroxides. It is official as *Sublimed, Washed,* and *Precipitated Sulphur.* Sulphuric acid and sulphates have neither the action nor uses of Sulphur.

Official Forms of Sulphur

Sulphur Sublimatum (*Sublimed Sulphur*). *Synonym,* Flowers of Sulphur. *Formula,* S = 31.83.—A fine, yellow, crystalline powder, obtained by vaporizing sulphur by the aid of heat, and condensing the vapor in a properly cooled chamber. It has a slight characteristic odor and a faintly acid taste. The powder is *insoluble* in water, but imparts to water an acid reaction by reason of the presence of sulphur dioxide, which exists in it as an impurity. Its solvents are as stated above.

Action and Uses.—When given internally, a small quantity is changed into hydrogen sulphide and other sulphides, but it is mostly, eliminated unchanged in the stools. When administered by the mouth, the drug acts as a mild *laxative,* but otherwise has little effect. When used locally in the form of an ointment, there is probably no drug so valuable in the treatment of *scabies,* commonly known as itch. Being insoluble in water, the drug may be *administered* in powders, capsules, confection, or, as is quite common in domestic medicine, mixed with molasses. Being acid in reaction, by reason of the presence of sulphur dioxide, it is less suitable for internal and external use than Washed Sulphur, which is made by washing precipitated sulphur with a weak aqueous solution of ammonia, and then drying. The vapor from burning sulphur mixed with steam is frequently used for disinfecting sick rooms. It is employed in preparing Washed and Precipitated Sulphur.

Dose.—0.6 to 4 Gm.; 10 to 60 grains.

Sulphur Lotum (*Washed Sulphur*). *Formula*, S = 31.83.—A fine, yellow, crystalline powder, without odor or taste, made by washing Sublimed Sulphur with a weak solution of ammonia water and water, to free it from sulphuric acid and other impurities.

Action and Uses.—Its action, uses, and doses are the same as those of Sublimed Sulphur. When taken internally, it is less likely to produce intestinal griping, and, when used locally, is less likely to produce irritation of the skin than is Sublimed Sulphur. It enters into the composition of Compound Powder of Glycyrrhiza, and Sulphur Ointment, and is used in making Sulphur Iodide.

Dose.—0.6 to 4 Gm.; 10 to 60 grains.

Unguentum Sulphuris (*Sulphur Ointment*).—Made by thoroughly incorporating 15 Gm. of Washed Sulphur with 85 Gm. of Benzoinated Lard. Used locally as a parasiticide.

Sulphur Præcipitatum (*Precipitated Sulphur*). *Synonyms*, Milk of Sulphur, Lac Sulphur. *Formula*, S = 31.83.—A fine, amorphous powder, of a pale yellow color, without odor or taste. Made by precipitating a solution of calcium disulphide with hydrochloric acid. It is usually prepared by adding a mixture of sulphur in water to a mixture of slaked lime, boiling for about an hour with occasional agitation, and adding water to replace the loss by evaporation. The mixture is then covered and placed to one side to permit it to cool and subside, after which the clear solution is carefully drawn off, and the remaining filtered. To the liquid thus obtained a weak solution of hydrochloric acid is added with constant stirring, until it becomes nearly neutral, or only slightly alkaline. The sulphur thus precipitated is collected on a strainer, and thoroughly washed and dried.

Action and Uses.—Sulphur in this form is commonly known as *Lac Sulphur*, and has the same action and uses as sublimed, or washed sulphur. Being in the form of a fine, amorphous powder, it is more suitable for dispensing in liquid mixtures, and makes a smooth ointment, entirely free from grittiness.

Dose.—0.6 to 4 Gm.; 10 to 60 grains.

Official Derivatives of Sulphur

Carbonei Disulphidum (*Carbon Disulphide*). *Formula*, CS_2 = 75.57.—A transparent, colorless, diffusive liquid, having a strong, disagreeable, but not fetid odor. It is very sparingly soluble in water, but *dissolves* freely in alcohol, ether, chloroform, and in fixed and volatile oils. It volatilizes rapidly at the ordinary temperature, is inflammable, and burns with a bluish-white flame.

Uses.—Carbon disulphide is not used internally, and rarely at all in the treatment of diseases, being highly poisonous when taken internally, and when its vapor is inhaled it is destructive to the blood. The substance is useful solely as a solvent. It dissolves rubber, sulphur, volatile oils, fats and many other substances of a similar nature. In the

arts it is used for the extraction of oils from seeds, as a cleansing agent, and in the manufacture of rubber goods. In pharmacy, it is used as a solvent in preparing mustard paper.

Calx Sulphurata (*Sulphurated Lime*). *Synonym*, Crude Calcium Sulphide.—Sulphurated lime is not a definite chemical salt, but a mixture containing at least 60 per cent. of calcium sulphide (CaS), together with unchanged calcium sulphate ($CaSO_4$) and carbon in varying proportions. It is made by mixing together dried calcium sulphate, charcoal, starch, placing lightly in a crucible covered loosely, and heated to bright redness until the contents lose their black color. After allowing the crucible to cool, the contents are reduced to powder by trituration and transferred to small glass-stoppered vials.

It is a pale, gray powder, exhaling a faint odor of hydrogen sulphide, having a nauseous and alkaline taste, and gradually decomposing upon exposure to moist air. It is insoluble in alcohol; very sparingly soluble in cold water, but more readily *soluble* in boiling water, which partially decomposes it, with the liberation of hydrogen sulphide.

Action and Uses.—Sulphurated lime in the presence of moisture when locally applied is an escharotic. A strong aqueous solution may be made use of as a local application for the removal of *superfluous hair*. Internally, it is employed in the treatment of *boils* and *pustular acne*.

Dose.—0.03 to 0.06 Gm.; $\frac{1}{2}$ to 1 grain.

Sulphuris Iodidum (*Sulphur Iodide*).—Grayish-black, brittle masses, having a metallic luster and a crystalline fracture. Made by heating together iodine and washed sulphur. It has a distinct odor of iodine, an acrid taste, is insoluble in water, dissolves in about 60 parts of glycerin, and is very soluble in carbon disulphide; it is only partially soluble in alcohol, ether, and a solution of potassium iodide, which dissolves all of the iodine, but leaves the sulphur undissolved. Upon exposure to the air, it gradually loses iodine.

Action and Uses.—When used locally in the form of an ointment, sulphur iodide possesses, in a measure, the medicinal properties of both iodine and sulphur. The ointment official in the British Pharmacopœia contains about 20 grains of sulphur iodide, 20 grains of glycerin, and 460 grains of benzoinated lard. It is used in the treatment of *tinea capitis*, *lupus*, *psoriasis*, and other chronic, non-inflammatory skin eruptions.

SUMBUL—Sumbul

Synonym, Muskroot. *Family*, Umbelliferæ.

Sumbul is the dried rhizome of an undetermined plant growing in Central and Northern Asia, and imported to this country mostly from Russia. The rhizome, as seen in the shops, is cylindrical, or transverse segments, $\frac{1}{3}$ to $\frac{1}{2}$ inch (8 to 12 mm.) in diameter; externally, dusky brown, annulate, longitudinally wrinkled; internally spongy

and brownish-yellow; odor, musk-like; taste, bitter. The root contains a *volatile oil*, having a peppermint-like taste and a soft, musk-like odor, angelic, valeric, and methyl crotonic acids, and a soft resin.

Action and Uses.—Sumbul is a mild circulatory stimulant and sedative to the nervous system. The drug appears not to sedate by depression, but, like musk and castor, to act as a *nerve tonic*. It is employed in the *nervousness of neurasthenia, of the menopause, of hysteria*, and other allied states.

Dose.—2 to 4 Gm.; ½ to 1 ʒ.

Official Preparation

Fluidextractum Sumbul (*Fluidextract of Sumbul*).—Made with a menstruum of alcohol, 7.5 parts, and water, 2.5 parts.

Dose.—2 to 4 Cc.; ½ to 1 fʒ.

TALCUM—Talc

The native hydrous magnesium silicate known as *Talc, Soapstone*, or *French Chalk* is ordinarily found in the shops as a white, or grayish-white powder, which, when rubbed between the fingers, has a smooth unctuous feel. It is also official in the form of irregular, grayish-green masses of a waxy luster. It is permanent in air, odorless, and tasteless, and insoluble in all ordinary solvents. The chief supply in this country is obtained from the States of New York and North Carolina.

Talcum Purificatum (*Purified Talc*).

Uses.—In its crude state, talc is unfit for uses in medicine and pharmacy, but when purified by boiling in a weak aqueous solution of hydrochloric acid, washing and drying, to remove mechanical impurities, and also compounds of aluminum, iron, and magnesium, it is useful as a *drying powder*, or a *dusting powder*, and as an insoluble powder upon which to distribute volatile oils used in the process of making many *official aromatic waters*.

TAMARINDUS—Tamarind

Family, Leguminosæ.

Tamarind is the preserved pulp of the fruit of *Tamarindus indica*, a tall, handsome tree native to India and Africa, and naturalized in the West Indies.

The fruit is a chocolate-brown, smooth, compressed and curved pod, 3 to 6 inches (75 to 150 mm.) long, and ½ to 1 inch (12 to 25 mm.) wide, bearing from 3 to 10 reddish-brown, smooth, oblong, or quadrangular, flattened seeds, each enclosed in a tough membrane, between which is a light-colored, acidulous, pulpy matter.

In its official form, tamarind is a light reddish, or dark brown, pulpy mass, prepared by removing the pericarp (outer shell) and beating the pulp seeds and fiber into a mass and preserving with sugar. It has a sweetish and agreeably acidulous taste.

The pulp contains tartaric, citric, mallic, and acetic acids, potassium bitartrate, sugar, pectin, and, in the testa of the seeds, tannic acid.

Action and Uses.—Tamarind is a *feeble laxative* and refrigerant. It may be used by making an infusion with warm water or boiled milk, straining, and cooling. It enters into the composition of Confection of Senna.

Dose.—4 to 30 Gm.; 1 ʒ to 1 ʒ.

TARAXACUM—Taraxacum

Synonym, Dandelion. *Family,* Compositæ.

Taraxacum is the dried root of *Taraxacum officinale,* collected in autumn, but the best results are obtained from the undried root, collected in August and September. The plant bearing the root is the common herb growing abundantly along roadsides, fields, and pastures.

The dried root is nearly cylindrical, tapering, several inches long, ½ to 1 inch (12 to 25 mm.) thick, somewhat branched; externally blackish-brown, longitudinally wrinkled; internally, yellowish, with a porous axis, and enclosed in a thick, whitish bark containing many milk vessels arranged in concentric circles. It has no distinct odor, but has a bitter taste. The drug contains a bitter crystalline principle known as *taracin,* and a resin.

Action and Uses.—Preparations made from taraxacum are used as a bitter *tonic,* and *mild hepatic stimulant.* The fluidextract is a suitable *vehicle* for more active vegetable drugs, and the extract a good pill excipient.

Official Preparations

Extractum Taraxaci (*Extract of Taraxacum*).—An extract of *pilular consistence.*

Dose.—0.3 to 2 Gm.; 5 to 30 grains.

Fluidextractum Taraxaci (*Fluidextract of Taraxacum*).—The drug is exhausted with diluted alcohol; 5 per cent. of *solution of sodium hydroxide* is added to the percolate.

Dose.—4 to 8 Cc.; 1 to 2 fʒ.

TEREBENUM—Terebene

A thin, colorless liquid, consisting of dipentene and other hydrocarbons, obtained by the action of concentrated sulphuric acid upon oil of turpentine, and subsequent rectification with steam.

It has an agreeable odor resembling thyme, a mild, aromatic, terebinthinate taste, is sparingly soluble in water, *soluble* in three times its volume of alcohol, and is neutral in reaction. Upon exposure to light and air, it develops resins, and becomes acid in reaction, and should, therefore, be kept in well-stoppered bottles, in a cool place protected from light. It enters into chemical combination with iodine, bromine, and chlorine.

Action and Uses.—Terebene is a stimulant to the respiratory and genito-urinary tracts. It is mostly employed as a stimulating expectorant in *subacute* and *chronic bronchitis*. It may be *administered* on sugar, or *prescribed* in emulsions or capsules.

Dose.—0.3 to 0.6 Cc.; 5 to 10 minims.

TEREBINTHINA—Turpentine

Family, Pinaceæ.

Turpentine is a concrete, natural oleoresin obtained as an exudate from *Pinus palustris*, and other species of pine trees growing in Virginia, North and South Carolina, Georgia, Alabama, and Texas. The oleoresin is usually procured by cutting boxes into the trunks of living trees, making scarifications above the boxes, and collecting the exudate with flat triangular dippers when the boxes have become partially or wholly filled. When recently collected, the oleoresin is semiliquid, but, in the shops, it is seen in light, yellowish, opaque, sticky masses, which, when cold, are brittle and more or less glossy, and having a characteristic odor and taste. It is liquefied by heat, and is highly inflammable, burning with a smoky flame. Its solution in alcohol is acid in reaction. The oleoresin contains about 20 to 30 per cent. of volatile oil, 50 to 69 per cent. of resin, a bitter principle, formic, succinic, and other acids.

Action and Uses.—Turpentine owes its action upon the human economy almost entirely to its volatile oil. It is a *stimulant*, *diuretic*, *carminative*, and *expectorant*. Locally, it is a *rubefacient* and *antiseptic*. It enters into the composition of Compound Resin Cerate. Rosin and Oil of Turpentine are obtained from crude turpentine.

Dose.—0.12 to 0.3 Gm.; 2 to 5 grains.

Derivatives from Turpentine and their Official Preparations

Oleum Terebinthinæ (*Oil of Turpentine*).—Recently distilled oil of turpentine. *Used* as a solvent in pharmacy and for local application, but not internally. It enters into the composition of Turpentine Liniment.

Oleum Terebinthinæ Rectificatum (*Rectified Oil of Turpentine*).—Rectified oil of turpentine, frequently, but improperly, spoken of as

Spirit of Turpentine, is prepared by treating oil of turpentine with solution of potassium hydroxide, distilling, and separating the clear oil from the water.

It is a clear, transparent, colorless, limpid, volatile, inflammable fluid, having a characteristic odor and taste, which becomes more pronounced by age and exposure to light and air. It is very slightly soluble in water, but *dissolves* in three times its own volume of alcohol, and dissolves fixed and volatile oils, fats, resins, soaps, and sulphur.

The oil has the chemical formula of $C_{10}H_{16}$, and is composed of one or more terpenes. When perfectly pure, it is free from oxygen, but upon exposure to the atmosphere it absorbs oxygen, becomes sticky and yellowish, and develops a product having the formulæ $C_{10}H_{14}O_4$, regarded as *camphoric peroxide*, which is converted by water into *hydrogen peroxide* and *camphoric acid;* therefore old oil of turpentine is regarded as an oxidizer. When the oil is heated to 300° C. (572° F.) for several hours in a hermetically sealed tube, it is converted into *iso-terebenthene*, with the formula $C_{20}H_{32}$, a readily oxidizable substance, which, upon exposure to the air, is converted into a viscid mass. When treated with a small portion of sulphuric acid, the oil yields, upon fractional distillation, *terebene* ($C_{10}H_{16}$), *cymene*, and *colophene*. With hydrochloric acid gas, it yields a crystalline substance, designated as *artificial camphor*. In contact with concentrated hydrochloric acid, the oil yields *a dihydrochloride*, with which a boiling alcoholic solution of potassium hydroxide forms *terpinol* $(C_{10}H_{16})_2 + H_2O$. The oil, when heated with chlorinated lime, yields *chloroform*. Nitric acid converts the oil into resin, and when boiled with it, *terebic acid*. Water in long contact with the oil forms *terpin hydrate* $C_{10}H_{18}(OH)_2 + H_2O$. The reaction is hastened by the presence of alcohol. Chlorine and bromine react violently with the oil, and may result in combustion. When iodine is dissolved in oil of turpentine, it gives off vapor of iodine and hydriodic acid; the mixture often explodes.

Action and Uses.—Oil of turpentine is used both internally and externally. *Internally*, in medicinal doses it is a stimulant to the circulation, respiration, to the mucous membrane of the respiratory and digestive tract, and also the genito-urinary tract. In addition, it is a hemostatic. It is administered in *subacute bronchitis, flatulency, diarrhœa, ulceration of the bowels, typhoid fever, chronic gonorrhœa, passive hemorrhages, purpura hæmorrhagica*, and for the removal of *tapeworms*. *Old, oxidized oil* has been recommended as an *antidote to phosphorus*, but it is difficult to procure. When long continued, or given in *overdoses*, oil of turpentine acts as an irritant to the mucous membrane of the stomach, bowels, kidneys, and bladder, and may cause vomiting, purging, strangury, bloody urine, and cyanosis. It may be *prescribed* in capsules, or emulsions, or administered on sugar. *Locally*, oil of turpentine is an antiseptic, parasiticide, stimulant, and hemostatic. Upon abrasions, cuts, etc., it first produces a stinging sensation, but, if the part is protected and kept clean, pain is alleviated and healing promoted. Upon the unbroken skin it acts as a stimulant and rubefacient, and in the pure

state, if applied continually for a number of hours, may cause blistering. It is in part absorbed from the skin. Mixed with oils, or as a stupe, the oil is applied locally as a counterirritant for the relief of *deep-seated inflammations*, particularly over the chest. Upon the abdomen stupes are applied for the relief of *tympany*. Mixed with oil, egg, and water it is popular as a rectal injection for the relief of *constipation* and *tympany*.

A *turpentine stupe* is made by dipping a piece of flannel into hot water, wringing the water from it, then dipping it into warm oil of turpentine, wringing out the oil and applying. Oil of turpentine, being inflammable, should not be brought near a flame, but may be heated by immersing a cup containing it in very hot water. Upon delicate skins, or when too long applied, a stupe may cause a blister.

When oil of turpentine is locally applied, and the bedding on which the patient sleeps is sprinkled with it, the oil is valuable for the cure of *itch*.

Dose.—0.13 to 0.6 Cc.; 2 to 10 minims.

Resina (*Rosin*).—Rosin is the residue left after distilling off the volatile oil from turpentine. It is usually seen in hard, translucent, amber-colored fragments, covered with a yellowish dust. When cold, it is easily pulverizable, but softens when gently heated, and liquefies at the temperature of about 152.5° C. (306° F.). It is inflammable, burning with a dense, smoky flame; is insoluble in water, but *dissolves* in ether, alcohol, benzene, carbon disulphide, acetic acid, fixed and volatile oils, and solution of potassium or sodium hydroxide.

Uses.—When combined with fatty substances, rosin raises their melting point, increases their consistency, and retards their oxidation. In *pharmacy*, it is used in preparing many *cerates* and *ointments*.

Official Preparation Containing Oil of Turpentine

Linimentum Terebinthinæ (*Turpentine Liniment*).

Ingredients.—Rosin Cerate, 65 Gm.; Oil of Turpentine, 35 Gm.

Used as a temporary dressing for recent *burns* and *scalds*.

Official Preparation Containing Rectified Oil of Turpentine

Emulsum Olei Terebinthinæ (*Emulsion of Oil of Turpentine*).

Ingredients.—Rectified Oil of Turpentine, 15 Cc.; Expressed Oil of Almond, 5 Cc.; Syrup, 25 Cc.; Acacia, 15 Cc.; Water, a sufficient quantity to make 100 Cc.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Official Preparations of Rosin

Ceratum Resinæ (*Rosin Cerate*). *Synonym*, Basilicon Ointment.—Made by adding 15 Gm. of Yellow Wax, and 50 Gm. of Lard to 35 Gm. of melted Rosin, and thoroughly stirring while it congeals.

Uses.—This cerate is popular, but of doubtful value for treating *boils, chilblains,* and *indolent ulcers.*

Ceratum Resinæ Compositum (*Compound Rosin Cerate*). *Synonym,* Deshler's Salve.—Made by melting together 22.5 Gm. of Rosin, 22.5 Gm. of Yellow Wax, 30 Gm. of Prepared Suet, 11.5 Gm. of Turpentine, adding 13.5 Gm. of Linseed Oil, straining through muslin, and stirring until cool.

Uses.—The same as rosin cerate.

TEREBINTHINA CANADENSIS—Canada Turpentine

Synonyms, Balsam of Fir, Canada Balsam. *Family,* Coniferæ.

Canada turpentine is a viscid, pale yellow, or greenish-yellow, transparent, liquid oleoresin, obtained as an exudate from vesicles formed upon the trunk of *Abies balsamea,* a beautifully cone-shaped balm tree growing in Canada, and in the United States as far south as Virginia.

The oleoresin has an agreeable odor; a terebinthinate, bitter, and slightly acrid taste; is only partially soluble in alcohol, but completely soluble in ether, chloroform, and benzene. It gradually dries and forms a transparent varnish, free from any granular or crystalline structure when exposed to the air, and solidifies when mixed with $\frac{1}{5}$ its weight of magnesium oxide previously moistened with water.

It consists chiefly of non-crystallizable resin, and a volatile oil (Terebene), and therefore the name *balsam* is a misnomer, as it contains neither cinnamic nor benzoic acids.

Action and Uses.—Canada turpentine possesses in a large measure the same medicinal properties as ordinary turpentine, but is used mostly as a protecting dressing for *small cuts* and *abrasions,* and as a basis to give body to plasters. It enters into the composition of Flexible Collodion. When intended for internal administration, it is best *prescribed* to be taken on sugar, or in emulsions, capsules, or in pills made up with moistened magnesium oxide.

Dose.—0.3 to 1 Cc.; 5 to 15 minims.

TERPINI HYDRAS—Terpin Hydrate

Formula, $C_{10}H_{20}O_2 + H_2O = 188.74$.

Terpin hydrate ($C_{10}H_{18}(OH)_2 + H_2O$) is the hydrate of the diatomic alcohol *Terpin,* $C_{10}H_{18}(OH)_2$, obtained by crystallization from a mixture of rectified oil of turpentine, alcohol, and nitric acid, and subsequent purification by crystallization from solution in cold alcohol.

It appears in colorless, lustrous, rhombic prisms, which are nearly odorless, and have a slightly aromatic and mildly bitter taste. The crystals are permanent in air, *soluble* in 200 parts of water, in 2 parts

of alcohol, and in about 100 parts of ether, 200 parts of chloroform, and 1 part of boiling glacial acetic acid.

Action and Uses.—Terpin hydrate is a stimulant to the respiratory and genito-urinary tracts. It is used mostly as a stimulating expectorant in treating *subacute* and *chronic bronchitis*. Being only sparingly soluble in water, it is best *prescribed* in capsules, pills, emulsions, or dissolved in aromatic elixir.

Dose.—0.06 to 0.2 Gm.; 1 to 3 grains.

THYMOL—Thymol

Formula, $C_{10}H_{14}O = 148.98$.

A phenol derived from the volatile oil of thyme, and some other volatile oils. It occurs in large, colorless, translucent rhombic prisms, having the odor and taste of oil of thyme, and a very slight, caustic effect upon the lips. It slowly volatilizes when exposed to the air, melts at 51° C. (122° to 123.8° F.). It is soluble in about 1100 parts of water, freely soluble in alcohol, ether, and chloroform, and also soluble in glacial acetic acid, and fixed and volatile oils.

Action and Uses.—Thymol is an antiseptic, deodorant, disinfectant, antipyretic, diffusible stimulant, and local anesthetic. It is used *internally* as an intestinal antiseptic in *typhoid fever*, and *fetid diarrhœa*, and *locally*, in solution, as a mouth wash in *ulcerated stomatitis*, and dissolved in oil as a spray in *coryza*, *rhinitis*, and *ozena*.

Incompatibilities.—Thymol liquefies when triturated with about an equal quantity of camphor, menthol, hydrated chloral, and phenol, and forms a soft mass when triturated with acetanilide, antipyrine, resorcinol, phenyl salicylate, or ethyl carbamate; it unites with alkalies to form a soluble salt; in solution, it throws down a red precipitate with iodine and alkali iodides; gives a green precipitate changing to a brown color with spirit of nitrous ether, and coagulates albumin.

Dose.—0.03 to 0.2 Gm.; 1 to 3 grains.

Official Compound

Thymolis Iodidum (*Thymol Iodide*). *Synonyms*, Aristol, Dithymol-diiodide. *Formula*, $C_{20}H_{24}O_2I_2 = 545.76$.—A chocolate-colored, or reddish-yellow powder, having a slightly aromatic odor. It is insoluble in water and glycerin, slightly soluble in alcohol, readily *soluble* in ether, chloroform, collodion, and in fixed and volatile oils, leaving a slight residue. Prepared by adding an aqueous solution of iodine and potassium iodide to an aqueous solution of thymol strongly alkalinized by sodium hydroxide, washing, and drying the resultant precipitate.

Action and Uses.—Thymol Iodide is used as an antiseptic dusting powder upon *cuts*, *abrasions*, and *ulcers*. It possesses to a certain degree

the antiseptic properties of iodine and thymol. While not as powerful as iodoform, for which it is frequently substituted, it has a less disagreeable odor.

TRAGACANTHA—Tragacanth

Family, Leguminosæ.

Tragacanth is a translucent, horny, gummy exudate, obtained from *Astragalus gummifer*, and other species of thorny *Astragalus*, an herb growing in mountainous regions of Western Asia. It is not a natural juice of the plant, but a degeneration product of the cells of the pith and medullary rays of the stem. Incisions are made into the stem of the herb during July or August, and the gum, which slowly exudes in curved or curled ribbon-like bands, is at first soft, but becomes hard and tough before it is collected.

In the shops it is seen in whitish or yellowish ribbon-shaped segments of various lengths, about $\frac{1}{24}$ to $\frac{1}{8}$ inch (1 to 3 mm.) thick; tough, more easily pulverizable by heating to about 50° C. (122° F.); inodorous and insipid. When treated with 50 parts of water it slowly swells and forms a cloudy gelatinous mass, which upon the further addition of water diffuses with it, but upon standing several days is in large part deposited, only a portion remaining in solution. It is insoluble in alcohol.

Tragacanth contains about 30 per cent. of bassorin, or insoluble gum, and 50 per cent. of soluble gum, water, and impurities.

Action and Uses.—This gummy substance is devoid of any physiological action, but is occasionally used as a demulcent in *acute inflammation* of the mouth, pharynx, and stomach. It is useful for suspending resins, oils, and heavy insoluble products in water, and on account of its adhesive properties, in making pills, and troches. Being only partially soluble in the juices of the stomach, it is less valuable than acacia for all these purposes, except for preparing troches. Tragacanth is used as the emulsifying agent in Emulsion of Chloroform, and as an excipient in Pills of Ferrous Carbonate, and a number of official troches.

Incompatibilities.—Aqueous mixtures are thickened by the addition of alcohol, lead acetate and subacetate, but unlike a solution of acacia is not coagulated by sodium borate or ferric compounds.

Dose.—Non-toxic, used as excipient.

Official Preparation

Mucilago Tragacanthæ (*Mucilage of Tragacanth*).

Ingredients.—Tragacanth, 6 Gm.; Glycerin, 18 Gm.; Water, a sufficient quantity to make 100 Cc.

Prepared by the aid of heat, and frequent straining through muslin. Used as a demulcent, and in preparing extemporaneous mixtures and emulsions.

Dose.—4 to 15 Cc.; 1 to 4 f℥.

TRITICUM—Triticum

Synonym, Couch Grass. *Family*, Gramineæ.

Triticum is the dried rhizome of *Agropyron repens*, a grass native to Europe, but grows abundantly in meadows and as a troublesome weed in cultivated fields throughout the United States.

The rhizome grows horizontally, is sub-cylindrical, about $\frac{1}{24}$ to $\frac{1}{12}$ inch (1 to 2 mm.) in diameter; brownish-yellow, or straw-colored, hollow, almost odorless, and has a sweet taste. As seen in the shops, it is cut into sections about $\frac{1}{5}$ to $\frac{2}{5}$ inch (5 to 10 mm.) long. It contains a gum-like substance resembling inulin, sugar, mucilage, etc.

Uses.—Decoctions and infusions of triticum have long been employed to *increase the urinary flow* in treating *inflammatory diseases of the bladder*. The tea may be taken in any quantity.

Dose.—8 to 15 Gm.; 2 to 4 ʒ, in decoction.

Official Preparation

Fluidextractum Tritici (*Fluidextract of Triticum*).—Made by exhausting the drug with boiling water, concentrating, and *adding* 33 per cent. of alcohol as a *preservative*.

Dose.—8 to 15 Cc.; 2 to 4 f ʒ.

ULMUS—Elm

Synonym, Slippery Elm, Red Elm. *Family*, Ulmaceæ.

Elm is the inner bark deprived of its outer cortex of *Ulmus fulva*, a handsome shade tree growing in all parts of the United States north of the Carolinas, but most abundantly west of the Alleghany Mountains.

Dried elm is seen in the shops in pieces of varying length and width, $\frac{1}{8}$ to $\frac{1}{6}$ inch (3 to 4 mm.) thick; outer surface light brown; inner surface yellowish-brown; flexible, breaks with a fibrous fracture, and has a faint, peculiar, sweetish odor, and when chewed is mucilaginous. Inferior bark is less flexible, breaks with a shorter fracture, and is less mucilaginous.

The bark contains an abundant quantity of *mucilage* soluble in water, some starch, and tannin. The mucilage is precipitated by lead acetate and subacetate, and in part by strong alcohol.

Action and Uses.—Mucilage of elm is an excellent demulcent, and is administered in treating *acute inflammation of the mouth, pharynx, stomach*, and by rectum in treating *dysentery*. It may be used in any quantity. A poultice made with powdered elm and hot water is employed in treating acute painful *inflammatory diseases affecting the skin*.

Official Preparation

Mucilago Ulmi (*Mucilage of Elm*).—Should be freshly prepared when wanted by digesting 6 Gm. of Elm with 100 Cc. of Water on a water-bath, in a covered vessel, during one hour, and then straining.

Dose.—Any quantity.

UVA URSI—Uva Ursi

Synonym, Bearberry. *Family,* Ericaceæ.

Uva ursi is the dried leaf collected in the autumn, of *Arctostaphylos Uva Ursi,* a trailing evergreen shrub closely resembling Trailing arbutus, indigenous to Europe, Asia, and the United States. In the latter country it grows as far south as New Jersey, and westward to California.

The leaves are ovate or oval-spatulate, $\frac{3}{5}$ to 1 inch (15 to 25 mm.) long, $\frac{1}{8}$ to $\frac{1}{3}$ inch (3 to 8 mm.) broad; short-stalked, coriaceous; margin entire and revolute; upper surface dark green, with depressed veins; lower surface reticulate and slightly pubescent; odor faint, hay-like; taste slightly astringent and somewhat bitter.

The leaves contain *Arbutin,* a non-toxic glucoside, *tannin, urosin, cricolin,* resin, volatile oil, etc. It yields its virtues to alcohol and water.

Action and Uses.—Uva Ursi has long been used as an astringent diuretic, and alterative. It is valued for its beneficial effects in *pyelitis,* and *subacute* and *chronic cystitis.* Arbutin, its active principle, is partly changed and eliminated in the bladder as hydrochinone, a substance possessing antiseptic properties. If administered in overdoses, the urine, upon exposure to air, assumes a dark or dark green color as a result of oxidation products of hydrochinone. The infusion of uva ursi is a popular and efficient means for administering the remedy. When long continued, all preparations of the drug are apt to disorder digestion.

Dose.—4 to 8 Gm.; 1 to 2 ʒ, in infusion.

Official Preparation

Fluidextractum Uvæ Ursi (*Fluidextract of Uva Ursi*).—Made by first macerating with a menstruum of alcohol, 20 Cc.; water, 50 Cc.; and glycerin, 30 Cc., to obtain 100 Cc., then finish percolating with a menstruum of alcohol, 2 parts, and water, 5 parts.

Dose.—4 to 8 Cc.; 1 to 2 fʒ.

VALERIANA—Valerian

Family, Valerianaceæ.

Valerian is the dried rhizome with its attached roots of *Valeriana officinalis,* an herbaceous plant cultivated and found growing wild in

Europe and Asia, and naturalized in the United States, where, in the New England States and New York State, it is cultivated and prepared for the market by the Shakers.

The drug is seen in the shops as a subglobular or obconical rhizome, ending abruptly as if cut off at both ends, about 1 to 1½ inches (25 to 35 mm.) long, ½ to ¾ inch (12 to 18 mm.) thick; externally, brownish; internally, whitish or pale brown, with a narrow circle of white wood under the thin bark. Its many attached roots are slender, brittle, brown, having a slender ligneous cord surrounded by a thick bark. The peculiar unpleasant odor of the fresh drug becomes stronger and disgusting upon keeping; its taste is camphoraceous and somewhat bitter.

Valerian contains a volatile oil, its most important constituent, *valeric acid*, *tannin*, resin, and less important constituents. The volatile oil has a pungent, disagreeable odor like valerian, contains *borneene*, a terpene, *borneol*, an alcohol (liquid and solid crystalline compound), and *borneol oxide*, an ether. Valeric acid, an oily, volatile liquid, having the characteristic odor of valerian, is not found in the fresh drug, but is an oxidation product of the oil.

Action and Uses.—Valerian has long been looked upon as a sedative to the nervous system, and of value in treating *nervous excitement*, *hysteria*, and similar functional conditions. In *overdoses*, it causes headache, mental depression, nausea, and diarrhœa.

Official Preparations

Fluidextractum Valerianæ (*Fluidextract of Valerian*).—Made with a menstruum of alcohol, 3 parts, and water, 1 part.

Dose.—2 to 4 Cc.; ½ to 1 f℥.

Tinctura Valerianæ (*Tincture of Valerian*).—Made by percolating 20 Gm. of Valerian with a menstruum of Alcohol, 3 parts, and Water, 1 part, to make 100 Cc. of tincture.

Dose.—4 to 15 Cc.; 1 to 4 f℥.

Tinctura Valerianæ Ammoniata (*Ammoniated Tincture of Valerian*).—Made by percolating 20 Gm. of Valerian with a menstruum of Aromatic Spirit of Ammonia to make 100 Cc. of tincture.

Dose.—2 to 4 Cc.; ½ to 1 f℥.

VANILLA—Vanilla

Family, Orchidaceæ.

Vanilla is the fruit of *Vanilla planifolia*, a climbing plant indigenous to the West Indies, Mexico, and South America, but now mostly cultivated. The beans are collected in the autumn, after they have reached their full growth, but before fully ripe, and cured by sweating them in blankets to develop their fragrant principle, sun-dried, oiled, and wrapped in foil.

The cured beans are about 6 to 10 inches (15 to 25 cm.) long, ⅓ inch (8 mm.) thick; externally, blackish-brown; longitudinally wrinkled, glossy, or covered with a whitish efflorescence of vanillin crystals, flexible and tough. They are one-celled, enclosing a blackish-brown pulp, and many minute dark, ovoid, and flattened seeds. The bean is fragrant and has an agreeable taste. When growing upon the vine, the bean is green; upon ripening, it becomes yellow and has but little odor or taste. Vanilla contains a crystallizable principle, *vanillin*, fixed oil, resin, sugar, etc.

Action and Uses.—Vanilla, its official preparation, and vanillin are used as *flavoring* agents.

Dose.—0.3 to 1 Gm.; 5 to 15 grains.

Official Preparation and Derivative

Tinctura Vanillæ (*Tincture of Vanilla*). *Synonym*, Essence of Vanilla.—Made by macerating 10 Gm. of Vanilla with 50 Cc. of a menstruum, of Water, 35 parts and Alcohol, 65 parts; drain, transfer the vanilla to a mortar, beat with 20 Gm. of Sugar, pack in percolator, and percolate with the reserve liquid, and enough of the menstruum of alcohol and water to make 100 Cc. of tincture.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

Vanillinum (*Vanillin*). *Formula*, $C_8H_8O_3$ = 150.92.—Chemically, vanillin is methylprotocatechuic aldehyde, *occurring* naturally in cured vanilla beans and the tissue of some other plants, *made synthetically* by oxidizing coniferin or eugenol, or by treating guaiacol with chloroform in the presence of an alkali, and also from other ortho-hydroxyl-benzene derivatives.

It is seen as fine, white, crystalline needles; soluble in about 100 parts of water, and more freely *soluble* in alcohol, ether, glycerin, and chloroform.

Uses.—Vanillin is used as a flavoring agent, but is conceded to be somewhat less agreeable and more fleeting than the natural flavor of the bean.

Dose.—0.015 to 0.06 Gm.; ¼ to 1 grain.

VERATRINA—Veratrine

Family, Liliaceæ.

Veratrine is a white, or grayish-white, amorphous powder, consisting of a mixture in varying proportions of alkaloids obtained from *sabadilla seeds*, the seeds of *Asagræa officinalis*, a bulbous plant growing in Mexico and Central America.

The powder is sparingly soluble in water, but *dissolves* in alcohol, ether, chloroform, fixed oils, and fats. The drug is odorless, has an acrid taste, and produces a tingling, benumbing sensation on the tongue.

On account of its intensely irritating, sternutatory, and toxic effects, *caution* should be observed in tasting it and in attempts to smell it.

Action and Uses.—Veratrine is an active irritant, sternutatory, and a circulatory and respiratory depressant. If smelled or applied in even minute quantities to the nasal mucous membrane, it produces intense irritation, accompanied by severe and prolonged sneezing. On the tongue, it causes a tingling benumbing sensation; on the skin, it produces first a sensation of warmth followed by a picking, painful sensation, redness, frequently vesication, and a benumbing sensation. When taken internally, in a small dose, the heart is slowed and weakened. In large doses, it causes gastro-intestinal irritation, and in *poisonous doses*, produces profound circulatory and respiratory depression, vomiting, purging, and muscular tremors, and occasionally tetanic convulsions. The drug is rarely administered internally. In the ointments and oleates it is occasionally used locally for the relief of *neuralgia*. As the drug is absorbed from the skin and may give rise to violent symptoms, it should be applied in very small quantities only. The power of veratrine and its preparations for harm so much outweigh its beneficial effects. that it is used but infrequently. So small a quantity as $\frac{1}{16}$ of a grain has given alarming symptoms.

Dose.—0.001 to 0.002 Gm.; $\frac{1}{60}$ to $\frac{1}{30}$ grain.

Official Preparations

Oleatum Veratrinæ (*Oleate of Veratrine*).—Made by dissolving 2 Gm. of Veratrine by trituration in 50 Gm. of Oleic Acid, and adding Olive Oil, a sufficient quantity to make 100 Gm. Being a toxic substance, not more than a few grains should be employed locally during twenty-four hours.

Unguentum Veratrinæ (*Ointment of Veratrine*).—Made by rubbing 4 Gm. of Veratrine with 6 Gm. of Expressed Oil of Almond, and then thoroughly incorporating with 90 Gm. of Benzoinated Lard. Being toxic in larger quantities, not more than a few grains should be employed locally during twenty-four hours.

VERATRUM—Veratrum

Synonyms, Veratrum Viride, American Hellebore, Indian Poke Root. *Family*, Liliaceæ.

Veratrum, formerly official as Veratrum Viride, is the dried rhizome and rootlets of *Veratrum viride*, known as American Hellebore, a large perennial herb growing in swamps or rich, damp woods in North America and of *Veratrum album*, growing under similar conditions in Europe, and northern Asia.

The rhizome is of upright growth, ovoid or obconical, truncate at its upper end; 1 to 3 inches (25 to 75 mm.) long, 1 to 2 inches (25 to 50

mm.) thick; externally, brown or blackish; internally, grayish or yellowish-white, beset with numerous whitish, or yellowish-brown, shriveled roots, 4 to 8 inches (100 to 200 mm.) long, and $\frac{1}{25}$ to $\frac{1}{12}$ inch (1 to 2 mm.) thick. The drug is odorless, but strongly sternutatory, and has a bitterish, acrid taste.

The chemical composition of veratrum has been a matter of considerable controversy, but the most recent investigations seem to show that it contains five basic principles, *jervine*, *rubijervine*, *pseudojervine*, *protoveratrine*, and *protoveratridine*.

Action and Uses.—Veratrum, in medicinal doses, slows the heart, lessens its force and reduces fever, and acts as an antispasmodic. In *overdoses*, it produces profound circulatory and respiratory depression, nausea, and vomiting. The drug is used to abort or modify on-coming *acute inflammation* in sthenic subjects, to quiet the heart in cases of *cardiac hypertrophy* and *irregularity*, and to prevent *puerperal convulsions*. In the last-named condition it is administered in full doses.

Official Preparations

Fluidextractum Veratri (*Fluidextract of Veratrum*).—Made with a menstruum of alcohol.

Dose.—As a circulatory sedative, 0.06 to 0.2 Cc.; 1 to 3 minims.

Tinctura Veratri (*Tincture of Veratrum*).—Made by percolating 10 Gm. of Veratrum with a menstruum of Alcohol to make 100 Cc. of tincture.

Dose.—As a circulatory sedative, 0.6 to 2 Cc.; 10 to 30 minims.

The use of Norwood's Tincture, a stronger and unofficial tincture of veratrum, is not recommended.

VIBURNUM OPULUS—Viburnum Opulus

Synonym, Cramp Bark. *Family*, Caprifoliaceæ.

Viburnum Opulus is the dried bark of *Viburnum Opulus* (High Cranberry), a handsome perennial shrub growing in North America from New Brunswick, in Canada, southward to Pennsylvania.

The bark is seen in curved pieces or quills of varying length, $\frac{1}{50}$ to $\frac{1}{12}$ inch (0.5 to 2 mm.) thick; outer surface grayish-brown, wrinkled, with brownish warts and black dots; inner surface light brown, longitudinally striate, fracture uneven and fibrous. Its odor is slight, and its taste mildly astringent and somewhat bitter.

The drug contains *viburnin*, *valeric acid*, resin, tannin, etc.

Action and Uses.—Viburnum opulus is mildly sedative to the nervous system, antispasmodic, diuretic, tonic, and astringent. Its most frequent use is to relieve *menstrual cramps*. For this purpose, the fluidextract is usually combined with aromatic and mild sedatives, and administered in hot water.

Dose.—4 to 8 Gm.; 1 to 2 ʒ, in decoction.

Official Preparation

Fluidextractum Viburni Opuli (*Fluidextract of Viburnum Opulus*).—Made with a menstruum of alcohol, 2 parts, and water, 1 part.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

VIBURNUM PRUNIFOLIUM—Viburnum Prunifolium

Synonym, Black Haw Bark. *Family,* Caprifoliaceæ.

Viburnum Prunifolium is the dried bark usually obtained from the branches of *Viburnum prunifolium,* Black Haw, a handsome perennial shrub growing in the Middle, eastern Middle, and Southern United States.

The bark is in irregular curved pieces or quills of varying length, rarely exceeding $\frac{1}{6}$ inch (4 mm.) in thickness; its external surface is of a dingy brown or purplish-brown color, with shallow fissures and scattered warts or scales; its inner surface is rust-brown; its fracture weak, short, and uneven. The bark has a peculiar odor, and a very bitter, somewhat astringent taste.

The drug contains a bitter principle, *viburnin, valeric acid,* resin, tannin, and less important principles.

Action and Uses.—Viburnum prunifolium is mildly sedative, antispasmodic, mildly astringent, diuretic, and tonic. It is used to prevent and allay *menstrual cramps,* to quiet *nervous disorders during pregnancy.* The fluidextract is ordinarily combined with aromatic and mild sedatives, and administered in hot water.

Dose.—4 to 8 Gm.; 1 to 2 ℥, in decoction.

Official Preparation

Fluidextractum Viburni Prunifolii (*Fluidextract of Viburnum Prunifolium*).—Made with a menstruum of alcohol, 2 parts, and water, 1 part.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

XANTHOXYLUM—Xanthoxylum

Synonyms, Prickly Ash, Toothache Bark. *Family,* Rutaceæ.

Xanthoxylum is the dried bark of *Xanthoxylum americanum,* or of *Fagara Clava-Herculis.* The first, known as Northern Prickly Ash, is a shrub or bush growing to the height of 5 to 25 feet, in moist, shady places throughout the Northern, Middle, and Western States, and furnishes a bark which is seen in commerce in curved or quilled fragments, about $\frac{1}{25}$ inch (1 mm.) thick; external surface brownish-gray with whitish patches and small black dots, and straight, sharp, two-edged, brown, glossy prickles, about $\frac{1}{5}$ inch (5 mm.) long; its inner surface is smooth and whitish.

Fagara Clava-Herculis, or Southern Prickly Ash, is a small tree growing in the Southern States, and furnishes a bark that is seen in commerce in large quills or sheets, $\frac{1}{24}$ to $\frac{1}{12}$ inch (1 to 2 mm.) thick; externally, light purplish-gray, with large silver-gray patches, and many conical corky projections, some of which bear stout brown spines or prickles. Both varieties are inodorous, and have a bitterish, very pungent taste. The bark contains resins, one of which is white, crystalline, and tasteless, another which is soft and acrid; a bitter principle, *xanthoxylin*, probably an alkaloid, an acrid volatile oil, tannin, and less important principles.

Action and Uses.—When chewed, xanthoxylum imparts a sensation of decided warmth to the mucous membrane of the mouth, and promotes a very free flow of saliva. When swallowed in small quantities, it produces a sensation of warmth in the stomach, and excites an increased flow of gastric juice. Locally, it is a stimulant and irritant. The drug is chewed to relieve toothache, applied locally as a counter-irritant in *subacute* and *chronic rheumatism*, and enjoys a reputation of possessing alterative properties, and in combination with iodides and mercurials is administered in treating *syphilis*.

Dose.—0.6 to 2 Gm.; 10 to 30 grains.

Official Preparation

Fluidextractum Xanthoxyli (*Fluidextract of Xanthoxylum*).—Made with a menstruum of alcohol, 3 parts, and water, 1 part.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

ZEA—Zea

Synonym, Corn Silk. *Family*, Graminaceæ.

Zea is the fresh, matted mass of yellowish, or brownish thread-like filaments, consisting of the styles and stigmas of the ordinary Indian corn (Zea Mays). It is nearly odorless, is faintly sweetish, and has a characteristic, not unpleasant flavor.

Action and Uses.—It is difficult to believe that this substance possesses any very decided medical action, but it is valued by some surgeons as a mild diuretic, and is used in the treatment of *acute cystitis*, and to relieve the burning pain of *acute gonorrhœa*. For these purposes an infusion is made by pouring a pint of boiling water over two ounces of fresh corn silk contained in a vessel, and when cool to be strained and drunk at liberty.

ZINCUM—Zinc

Formula, Zn = 64.9.

Pure zinc is a bluish-white, brittle metal, showing a crystalline fracture, usually obtained by roasting *calamine* (impure zinc carbonate),

with powdered charcoal, and distilling into a chamber from which air is excluded. When exposed to the air or in water, it becomes covered with a thick, whitish coat of zinc oxide or hydrate; at a temperature between 100° C. (212° F.) and 150° C. (302° F.) it becomes malleable and ductile; above 200° C. (392° F.) it may be powdered; at 412° to 415° C. (773.6° to 779° F.) it liquefies, and at 940° C. (1724° F.) it boils and vaporizes. When treated with sulphuric or hydrochloric acid, it dissolves and evolves hydrogen. The metal in the impure state is likely to be contaminated by compounds of sulphur, arsenic, antimony, phosphorus, cadmium, lead, and copper, from which the metal in the official form should be found free.

With the exception of the oxide and precipitated carbonate, all the salts of zinc are freely soluble in water, and are all astringent in their action; in *toxic doses*, they produce gastro-enteritis, and are antidoted by soluble carbonates, mucilages, and bland oils.

Incompatibilities.—The soluble salts of zinc are precipitated from aqueous solution by alkali hydroxides, lime water, soluble arsenates, carbonates, cyanides, phosphates, sodium borate, and tannic acid. They coagulate albumin and precipitate it from solution.

The metal is used in pharmacy for preparing hydrogen, and for making the official salts of zinc.

Official Salts and Preparations

Zinci Acetas (*Zinc Acetate*). *Formula*, $Zn(C_2H_3O_2)_2 + 2H_2O$ = 217.82.—Soft, white scales, or six-sided, monoclinic plates, of a pearly luster. Usually made by acting upon zinc carbonate, zinc oxide, or pure zinc with acetic acid. It effloresces in air, has a faintly acetous odor, an astringent and metallic taste, an acid reaction, and is *soluble* in about 2.5 parts of water, and 36 parts of alcohol.

Action and Uses.—Zinc acetate in solution acts *locally as an astringent*, but somewhat less powerfully so than the sulphate. It is rarely used as an astringent internally in the treatment of *serous diarrhœa*.

Dose.—0.06 to 0.12 Gm.; 1 to 2 grains.

Zinci Bromidum (*Zinc Bromide*). *Formula*, $ZnBr_2$ = 223.62.—Zinc bromide is official as a white, granular powder. It is very deliquescent, *soluble* in water and alcohol, is odorless, and has a sharp saline, metallic taste, and slightly acid reaction.

The salt may be made by acting upon zinc with bromine water, or by double decomposition between hot solutions of zinc sulphate and potassium bromide, and, after cooling, the addition of alcohol to separate potassium sulphate, and lastly evaporating to dryness and granulating.

Action and Uses.—Zinc bromide has the same sedative action as other bromides, but is more astringent than the alkali bromides, and

more irritating to mucous membranes. Being deliquescent, it should not be prescribed in powders or compressed tablets.

Dose.—0.06 to 0.12 Gm.; 1 to 2 grains.

Zinci Carbonas Præcipitatus (*Precipitated Zinc Carbonate*).—This white, impalpable powder of somewhat variable chemical composition is made by boiling a soluble salt of zinc (usually the sulphate) with sodium carbonate. It is sometimes known as Hydrated Zinc Carbonate on the assumption that its formula is as follows: $(ZnCO_3)_2$-$3Zn(H_2O)_2$. It is odorless, tasteless, *insoluble* in water and alcohol, but is *soluble* in ammonia water, or in a solution of ammonium carbonate, and also with active effervescence in diluted sulphuric acid.

Action and Uses.—Precipitated zinc carbonate replaces in medicine the no longer official impure zinc carbonate, *Calamine*, as an astringent, absorbent, and protective dressing in the treatment of moist *subacute* and *chronic skin diseases*. For this purpose, it may be employed in mixture or as an ointment.

Zinci Chloridum (*Zinc Chloride*). *Formula*, $ZnCl_2$ = 135.26.—Zinc chloride is seen as a very deliquescent, white, granular powder, or irregular porcelain-like masses, or in moulded pencils. It is highly caustic, and should not be tasted except in greatly diluted solution, which has an astringent metallic taste, and an acid reaction. The salt is odorless, and freely *soluble* in water and alcohol.

Zinc chloride may be made by adding zinc to hydrochloric acid, evaporating, and granulating. The pencils made by fusing the salt at a temperature of about 115° C. (227° F.) and pouring into moulds to keep cool.

Action and Uses.—Zinc chloride is highly destructive to animal tissues, and is sometimes carefully employed as an escharotic to remove small *skin cancers*, or other similar *growths*, or to destroy unhealthy granulations within *chronic cutaneous ulcers*. Solutions of the salt in water are employed for disinfecting the dejecta from the sick room.

Poisoning and Treatment.—If swallowed, the salt gives rise to violent gastro-enteritis, which is to be *treated* by the free administration of sodium carbonate dissolved in water, and tannic acid, and the administration of bland oils, mucilages, and milk.

Liquor Zinci Chloridi (*Solution of Zinc Chloride*).—A strongly acid, colorless, and odorless aqueous solution containing 50 per cent. of zinc chloride, made by treating granulated zinc with hydrochloric acid.

Uses.—This liquid, formerly known as Burnett's Disinfecting Fluid, is used as a disinfectant for dejecta from the sick room, for privies, etc.

Poisoning by solution of zinc chloride is to be treated by the administration of a solution of sodium carbonate, mucilages, oils, and milk.

Zinci Iodidum (*Zinc Iodide*). *Formula*, ZnI_2 = 316.70.—Zinc iodide is official as a white, granular powder. Upon exposure to air, it deliquesces and liberates iodine, becoming brown. It is odorless, has a sharp, saline, and metallic taste, an acid reaction, and is readily

soluble in water, alcohol, and ether. The salt may be made by digesting zinc in water with iodine diffused in it, evaporating, and granulating.

Action and Uses.—Zinc iodide, like other soluble iodides, is used as an alterative. It has the disadvantage of constipating the patient and disturbing digestion. Being unstable, it is best *administered* in syrup, either dispensed in a blue bottle or in a bottle covered by blue paper to protect it from light.

Dose.—0.03 to 0.12 Gm.; $\frac{1}{2}$ to 2 grains.

Zinci Oxide (*Zinc Oxide*). *Formula*, ZnO = 80.78.—This important compound of zinc in its official form is a soft, very fine, amorphous, white, or slightly yellowish-white powder, free from odor, taste, or gritty particles. When exposed to the air, it slowly absorbs carbon dioxide. It is *insoluble* in water, or alcohol, but should dissolve without effervescence in diluted acids and also in ammonia water, and in a solution of ammonium carbonate. Zinc oxide may be made by subjecting chemically pure precipitated zinc carbonate contained in a shallow dish to a low red heat until entirely free from carbon dioxide and water.

Action and Uses.—Zinc oxide is rarely used internally as an astringent, but is most popular and valuable as an absorbent, mildly astringent, dusting powder, and in ointments and other dressings in the treatment of numerous *moist* or *weeping skin diseases*. It is used in making the official Ointment of Zinc Oxide. It is also suitable for incorporating into plaster mulls and mixtures intended for external application.

Dose.—0.06 to 0.3 Gm.; 1 to 5 grains.

Unguentum Zinci Oxidi (*Ointment of Zinc Oxide*).—Made by thoroughly incorporating 20 Gm. of Zinc Oxide with 80 Gm. of melted Benzoinated Lard, and stirring thoroughly until it congeals.

Used as a sedative astringent dressing in treating *moist inflammatory diseases of the skin.*

Zinci Phenolsulphonas (*Zinc Phenolsulphonate*). *Synonym*, Zinc Sulphocarbolate. *Formula*, $Zn(C_6H_5O_4S)_2 + 8H_2O = 551.56$.—This salt of zinc, introduced into medicine with the expectation of furnishing a salt possessing the astringency of zinc and the antiseptic properties of phenol, is made by precipitating a solution of barium phenolsulphonate by zinc sulphate, and after separating the barium sulphate thus formed, evaporating, crystallizing, and washing the crystals of zinc phenolsulphonate.

The salt is seen in colorless, transparent, rhombic prisms, or tabular crystals, which effloresce upon exposure to the air, and frequently become of a pinkish color. It is free from odor, has an astringent, metallic taste; is acid in reaction, and *dissolves* in 1.7 parts of water and in the same quantity of alcohol. At a high temperature, it burns and emits an inflammable vapor having the odor of phenol.

Action and Uses.—Zinc phenolsulphonate is administered internally in *intestinal fermentation* and *diarrhœa* as an astringent and antiseptic,

but as the salt is eliminated from the body unchanged, it probably has very feeble or no antiseptic action. In solution, or as a powder, it is occasionally applied to foul discharging skin lesions to act as an astringent, antiseptic, and stimulant lotion.

Dose.—0.06 to 0.3 Gm.; 1 to 5 grains.

Zinci Stearas (*Zinc Stearate*).—Zinc stearate is a very fine, light, tasteless powder, having a faint odor of fat, permanent in air, and of varying chemical composition. In addition to zinc stearate, it contains varying proportions of zinc palmitate.

It is *insoluble* in water, alcohol, or ether; should have a neutral reaction when moistened, and, when burned, emits the odor of burning fat.

Action and Uses.—Zinc stearate is used as a feebly astringent, absorbent dusting powder, and as an astringent and sedative dressing in various moist diseases of the skin. It is suitable as a local application in the form of a powder, ointment, mull, and in a mixture. It enters into the official Ointment of Zinc Stearate.

Unguentum Zinci Stearatis (*Ointment of Zinc Stearate*).—Made by thoroughly incorporating 30 Gm. of Zinc Stearate with 50 Gm. of melted White Petrolatum, and stirring thoroughly while it congeals. Used as a mild sedative astringent dressing in the treatment of *moist inflammation of the skin.*

Zinci Sulphas (*Zinc Sulphate*). *Formula,* $ZnSO_4 + 7H_2O = 285.41$. —This very popular salt of zinc so closely resembles magnesium sulphate in appearance that numerous cases of poisoning have occurred by reason of mistaking it for that salt. It is furnished in colorless, transparent, rhombic crystals, or a granular, crystalline powder, free from odor, and having a strong astringent and metallic taste. In dry air it effloresces, losing a large part of its water of crystallization; is *freely soluble* in water and glycerin, but insoluble in alcohol. Its solution in water is acid in reaction.

Action and Uses.—Zinc sulphate is a most pronounced astringent and prompt emetic. Its solution in water is used as a local application in treating *catarrhal inflammation of various mucous membranes,* such as *conjunctivitis, urethritis,* and *vaginitis.* In doses of about 2 grains (0.12 Gm.), it is employed as an astringent in diarrhœa, and in doses of about 20 grains (1.2 Gm.), as an emetic. *Overdoses* give rise to violent gastro-enteritis, which is treated by the use of the stomach pump, the administration of soluble carbonates of tannic acid as a chemical antidote, and the administration of bland oils, eggs, and milk to protect and soothe the gastro-intestinal mucous membrane.

Dose.—As an emetic, 1.2 Gm.; 20 grains. As an astringent, 0.12 Gm.; 2 grains.

Zinci Valeras (*Zinc Valerate*). *Synonym,* Zinc Valerianate. *Formula,* $Zn(C_6H_9O_2)_2 + 2H_2O = 301.28$. — Zinc valerate is seen in white, pearly scales, having the odor of valeric acid, and a sweetish, astringent, and metallic taste. On exposure to the air it slowly loses

valeric acid. It is *soluble* in about 50 parts of water, and about 35 parts of alcohol. Boiling renders an aqueous solution of the salt turbid from loss of valeric acid and formation of a basic salt. When heated the salt melts and at a high temperature gives off inflammable vapors, leaving a residue of zinc oxide. The salt is made by mixing hot solutions of zinc sulphate and sodium valerate, collecting the crystals which form as a scum as the liquid cools. Concentrating the remaining liquid at a temperature not exceeding 93.3° C. (200° F.), cooling and collecting the crystals which form as a scum. The crystals thus collected are washed with a small quantity of cold water, drained and dried without the application of heat or filter paper.

Action and Uses.—Zinc valerate is a mild sedative to the nervous system, and is used in cases of *nervous excitement, hysteria,* and *whooping cough.* It is best prescribed in capsules or for children in syrups or elixirs.

Dose.—0.06 to 0.3 Gm; 1 to 5 grains.

ZINGIBER—Ginger

Family, Zingiberaceæ.

Ginger is the dried rhizome of *Zingiber officinalis,* an herb native to Hindostan, but also cultivated in Africa, the West Indies, and, in fact, in all subtropical countries. The creeping rhizome is biennial or perennial, and is of greatest value when collected in January or February, from plants about one or two years old. After being collected, cleansed, and scalded in boiling water, to prevent germination, the rhizome is thoroughly dried. Not infrequently it is coated with lime or calcium carbonate to protect it from insects, and sometimes scraped and bleached, and coated with calcium carbonate to whiten it. In commerce, it is known as *Black,* or *White Ginger;* the latter is deprived of its epidermis.

Official ginger is in laterally compressed, irregularly branched pieces deprived of its epidermis; externally, white or pale buff and longitudinally striate. It breaks with a short fibrous fracture, revealing many resin and oil cells and circular groups of fibrovascular bundles. The odor of the drug is agreeably and strongly aromatic; its taste spicy, pungent, hot, and biting. The above-described variety is commonly known as Jamaica ginger.

The active constituents of ginger are an aromatic volatile oil (a terpene), which it should contain in the quantity of about 2 per cent., a pungent resin, and a pungent resin-extractive principle. Commercial powdered ginger is occasionally adulterated with powdered ginger which has been exhausted of its soluble constituents, and with rice, starch, powdered capsicum, powdered mustard, or powdered galenger root. Liquid preparations of the drug are occasionally adulterated by the addition of oleoresin of capsicum.

Action and Uses.—Ginger is a stimulant, carminative, anodyne, sternutatory, rubefacient, sialogogue, and agreeable flavoring agent. Internally, it is employed to stimulate digestion, relieve *flatulency,* alleviate *griping intestinal pain* and *menstrual pains, serous diarrhœa,* and with purgatives *to prevent griping.* All preparations of the drug should be well diluted with water at the time of *administering* them, as in concentrated form they may produce acute gastritis. Locally, in poultices it is applied in *bronchitis, cholera infantum, summer diarrhœa, abdominal pain,* and *muscular rheumatism.*

Powdered ginger enters into the composition of Aromatic Powder, Aromatic Fluidextract, and Compound Powder of Rhubarb.

Dose.—0.6 to 2 Gm.; 10 to 30 grains.

Official Preparations

Fluidextractum Zingiberis (*Fluidextract of Ginger*).—Made with a menstruum of alcohol.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

Oleoresina Zingiberis (*Oleoresin of Ginger*).—A clear, thick, dark brown liquid, made by percolating powdered ginger with acetone.

Dose.—0.03 to 0.06 Cc.; $\frac{1}{2}$ to 1 minim.

Syrupus Zingiberis (*Syrup of Ginger*).

Composition.—Fluidextract of Ginger, 3 Cc.; Alcohol, 2 Cc.; Magnesium Carbonate, 1 Gm.; Sugar, 82 Gm.; Water, a sufficient quantity to make 100 Cc. of syrup.

Dose.—4 to 15 Cc.; 1 to 4 f℥.

Tinctura Zingiberis (*Tincture of Ginger*).—Made by percolating 20 Gm. of Ginger with Alcohol to make 100 Cc. of tincture. This tincture is one of the ingredients of Aromatic Sulphuric Acid.

Dose.—1 to 8 Cc.; 15 to 120 minims.

PART III

OFFICIAL PREPARATIONS ALPHABETICALLY ARRANGED

ACETA—Vinegars

VINEGARS are liquid preparations made by treating vegetable substances with diluted acetic acid. Being acid in reaction, they should not be combined with alkali carbonates, or bicarbonates, alkalies, or other substances which are incompatible with acids. The vinegars are not so stable as the tinctures. Only two are official.

Acetum Opii (*Vinegar of Opium*).—Made by macerating 10 Gm. of Powdered Opium and 3 Gm. of Powdered Myristica with 50 Cc. of Diluted Acetic Acid, straining, expressing, and filtering, dissolving 20 Gm. of Sugar in the filtrate, and adding enough Diluted Acetic Acid through the filter to make 100 Cc. of vinegar of opium.

Dose.—0.3 to 1.2 Cc.; 5 to 20 minims.

Acetum Scillæ (*Vinegar of Squill*).—Made by macerating 10 Gm. of Squill with 99 Cc. of diluted acetic acid, straining, adding through the strainer enough Diluted Acetic Acid to make 100 Cc. of liquid, boiling, filtering while hot, and, when cool, adding enough Diluted Acetic Acid to make 100 Cc. of vinegar of squill. Used in making Syrup of Squill.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

AQUÆ—Waters

Waters are aqueous solutions of volatile substances. The volatile substance may be a liquid, such as one of the volatile oils; a solid, such as camphor; or a gas, such as ammonia. Solutions of these substances may be effected in water, either by (1) simple solution in cold water or in hot water; (2) by passing the gas through water; (3) by distillation or filtration through absorbent powder or shredded filter paper. Including potable water in its purest obtainable state known as Aqua, there are nineteen official waters; they are mostly used as agreeable vehicles or solvents in which to administer more potent remedies.

Those not used as potent vehicles are *ammonia water, stronger ammonia water, creosote water, hamamelis water,* and *solution of hydrogen dioxide.* Water is a good solvent for the various salts and gums, but precipitates resins and oils from their alcoholic solutions. The official waters follow.

Aqua (*Water*).—Potable water in its purest obtainable state. A *hard water* is one containing in solution the salts calcium carbonate and sulphate, and magnesium carbonate; with a solution of soap, it precipitates a soluble lime soap. A water is said to be *temporarily hard* when it contains calcium and magnesium carbonate, which are precipitated upon boiling. *Rain water* and *snow water* are free from saline compounds, with the exception of the first water falling at the commencement of rain or snow, which contains particles of dust and various organic impurities taken from the atmosphere; therefore, the purest obtainable potable water is that which is collected during the latter part of a heavy rain or snow storm. *Used* as a solvent.

Aqua Ammoniæ (*Ammonia Water*).—An aqueous liquid containing 10 per cent., by weight, of gaseous ammonia.

Dose.—0.3 to 1 Cc.; 5 to 15 minims.

Aqua Ammoniæ Fortior (*Stronger Ammonia Water*).—A colorless, aqueous liquid, containing 28 per cent., by weight, of Ammonia gas. It has a characteristic odor of ammonia, and is strongly alkaline. It evolves dense, white fumes when brought near to hydrochloric or acetic acid, and should be kept in a cool place, and care observed when opening the retainer for the first time. This strongly aqueous solution of ammonia gas is not used for medicinal purposes, but employed in the manufacture of ammonia water, and other pharmaceutical preparations.

Aqua Amygdalæ Amaræ (*Bitter Almond Water*).—Made by agitating 1 Cc. of Oil of Bitter Almond in 999 Cc. of Distilled Water.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Aqua Anisi (*Anise Water*).—Made by triturating 2 Cc. of oil of anise with 15 Gm. of Purified Talc, adding 1000 Cc. of Distilled Water gradually with constant trituration, and filtering.

Dose.—4 to 30 Cc.; 1 to 8 f℥.

Aqua Aurantii Florum (*Orange Flower Water*).—Made by mixing equal volumes of Stronger Orange-Flower Water and Distilled Water.

Dose.—4 to 30 Cc.; 1 to 8 f℥.

Aqua Aurantii Florum Fortior (*Stronger Orange Flower Water*).—Water saturated with the volatile oil of fresh orange-flowers, obtained as a bi-product in the distillation of the oil of orange-flowers.

Dose.—2 to 16 Cc.; ½ to 4 f℥.

Aqua Camphoræ (*Camphor Water*).—Made by dissolving 8 Gm. of Camphor in 8 Cc. of Alcohol, triturating with 15 Gm. of Purified Talc, and then with Distilled Water, filtering, and adding enough Distilled water through the filter to make 1000 Cc.

Dose.—4 to 16 Cc.; 1 to 4 f℥.

Aqua Chloroformi (*Chloroform Water*).—A supersaturated solution of chloroform in distilled water. Made by adding enough Chloroform to a convenient quantity of Distilled Water, contained in a dark amber-colored bottle, to maintain a slight excess of chloroform after the contents have been repeatedly and thoroughly shaken. When required for use, decant off what is needed.

Dose.—4 to 30 Cc.; 1 to 8 f℥.

Aqua Cinnamomi (*Cinnamon Water*).—Made by triturating 2 Cc. of Oil of Cinnamon with 15 Gm. of Purified Talc, adding 1000 Cc. of Distilled Water with continued trituration, and then filtering until clear.

Dose.—4 to 30 Cc.; 1 to 8 f℥.

Aqua Creosoti (*Creosote Water*).—Made by dissolving 10 Cc. of creosote in 990 Cc. of distilled water, shaking well together and filtering.

Dose.—4 to 30 Cc.; 1 to 8 f℥.

Aqua Destillata (*Distilled Water*).—Made by collecting 800 volumes of water distilled from a suitable apparatus provided with a block, tin, or glass condenser, after having rejected the first 100 volumes of the distillate which contains the volatile impurities, from 1000 volumes of water. Distilled water is not necessarily sterile. It is used as a solvent for potassium permanganate, silver nitrate, both of which are changed by the organic and inorganic impurities of ordinary water, and also as a solvent in all prescriptions calling for water.

Aqua Fœniculi (*Fennel Water*).—Made by triturating 2 Cc. of Oil of Fennel with 15 Gm. of Purified Talc, continuing the trituration while adding 1000 Cc. of Distilled Water, and filtering until clear.

Dose.—4 to 30 Cc.; 1 to 8 f℥.

Aqua Hamamelidis (*Hamamelis Water*).—Made by macerating 1000 Gm. of Hamamelis bark in 2000 Cc. of Water for twenty-four hours, then distilling until 850 Cc. of distillate are obtained, and then adding 150 Cc. of Alcohol.

Dose.—2 to 8 Cc.; ½ to 2 f℥.

Aqua Hydrogenii Dioxidi (*Solution of Hydrogen Dioxide*).—A slightly acid, aqueous solution of hydrogen dioxide (H_2O_2), which should contain, when freshly prepared, about 3 per cent., by weight, of absolute Hydrogen Dioxide, corresponding to about 10 volumes of available Oxygen. It is usually made by decomposing a solution of barium dioxide by sulphuric acid. Upon removing the stopper from a bottle containing solution of hydrogen dioxide, not more than a slight pressure should be observed.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Aqua Menthæ Piperitæ (*Peppermint Water*).—Made by triturating 2 Cc. of Oil of Peppermint with 15 Gm. of Purified Talc, continuing the trituration while adding 1000 Cc. of Distilled Water, and then filtering until clear.

Dose.—4 to 30 Cc.; 1 to 8 f℥.

Aqua Menthæ Virdis (*Spearmint Water*).—Made by triturating 2 Cc. of Oil of Spearmint with 15 Gm. of Purified Talc, continuing the trituration while adding 1000 Cc. of Distilled Water, and then filtering.

Dose.—4 to 30 Cc.; 1 to 8 f℥.

Aqua Rosæ (*Rose Water*).—Made by mixing equal volumes of Stronger Rose Water and Distilled Water.

Dose.—4 to 30 Cc.; 1 to 8 f℥.

Aqua Rosæ Fortior (*Stronger Rose Water*).—Water saturated with the volatile oil of rose petals, obtained by distillation.

Dose.—2 to 16 Cc.; ½ to 4 f℥.

CACHETÆ—Cachets

Cachets, also known as *wafers*, are round concave solids, made in two parts by pressing soft dough between hot plates. They vary in size from ½ to ¾ of an inch in diameter, and are used as envelopes for administering quinine, compound licorice powder, and other similar substances, of which the dose is from 10 to 30 grains. They are filled by placing the powder in the concavity of one wafer, moistening its edge, and moistening the edge of another wafer, and then pressing the edges of both wafers firmly together. They are intended to be swallowed whole, first moistening them with water, or placing them in a tablespoon filled with water. *None are official.*

CAPSULÆ—Capsules

Capsules are gelatin envelopes intended for the administration of oils or oleoresinous liquids, or of powders. There are two kinds, *soft* and *hard capsules*. *Hard capsules* are made in two parts, so that when one part is filled with the powder, it may be fitted with the cap. The hard capsules are suitable for administering powders in the quantities of ½ to 10 grains. *Soft capsules* are prepared by adding a small quantity of glycerin to solidified gelatin, previously softened by heat to form egg-shaped capsules. Soft capsules are usually filled by means of a pipet and sealed with liquefied gelatin; they are of such sizes as to hold from 5 minims to 4 fluidrachms. *None are official.*

CATAPLASMATA—Poultices

Poultices are soft solid preparations intended to be used locally, as a means for applying heat or moisture to a localized area. Occasionally they are used as a means of obtaining the systemic effect of the drugs from which they are made, and frequently as counterirritants.

There is but one official cataplasm, that of kaolin, which is used as a mild sedative astringent.

Extemporaneous poultices may be made from powdered drugs by mixing them with flour, or with ground flaxseed, making into a paste by the addition of warm water, and spreading upon pieces of thick new linen or muslin, covering with another piece of fabric, applying to the surface of the body, and covering with a piece of oiled paper to protect the clothing. *Spiced poultices* are usually made by mixing about one ounce each of ground allspice, cloves, cinnamon, nutmeg, and ginger, or any of the other spices, transferring them to a flannel bag of the proper size, closing the mouth of the bag by stitches, distributing the powder evenly in the bag by shaking, quilting through from side to side and lengthwise, so as to keep the powder from collecting at one place, and, lastly, moisten one side of the poultice with warm whisky, alcohol, or vinegar, and applying the dry side to the body.

Cataplasma Kaolini (*Cataplasm of Kaolin*).—The cataplasm is made by heating 57.70 Gm. of pulverized Kaolin in a suitable vessel at 100° C. (212° F.), with occasional stirring for one hour, mixing it intimately with 4.5 Gm. of powdered Boric Acid, and then incorporating the mixture thoroughly with 37.5 Gm. of Glycerin; finally adding 0.05 Gm. of Thymol, which has been dissolved in 0.2 Gm. of Methyl Salicylate and 0.05 Gm. of Oil of Peppermint, and making a homogeneous mass. Being hygroscopic, it should be kept in an air-tight container.

When spread on new muslin, applied to the surface of the skin, covered with paraffin paper, and held in position by a bandage, it is of value to allay *acute local inflammations*.

CERATA—Cerates

Cerates are soft, unctuous preparations, consisting of medicinal substances incorporated with oil or lard, mixing with a sufficient quantity of wax, spermaceti, or rosin to raise the melting point of the oil or lard, so that the preparations will not liquefy at the temperature of the body. They are intended to be spread upon muslin, linen, or some other suitable fabric, and applied to the surface of the body to produce a local effect. Cerates should be free from rancidity, and should not contain any gritty particles. The official camphor cerate does not keep well, and should be freshly prepared when wanted.

The following cerates are official:

Ceratum (*Cerate*). *Synonym*, Simple Cerate.—Made by melting 30 Gm of White Wax, adding 20 Gm. of White Petrolatum, then 50 Gm. of Benzoinated Lard, continuing the heat until the mixture is liquefied, and stirring it constantly until it congeals. For southern latitudes, and during the heated season in other localities, 5 Gm. of benzoinated lard may be replaced by 5 Gm. of white wax. *Used* as a basis for making extemporaneous cerates.

Ceratum Camphoræ (*Camphor Cerate*).—Made by melting 35 Gm. of White Wax, adding 15 Gm. of White Petrolatum, and then 40 Gm. of Benzoinated Lard, continuing the heat until the mixture is liquefied, and, while cooling, adding 10 Gm. of Camphor Liniment, and incorporating it thoroughly by stirring until it congeals.

Used as a stimulating dressing, but primarily introduced into the pharmacopœia for making Cerate of Lead Subacetate extemporaneously.

Ceratum Cantharidis (*Cantharides Cerate*). *Synonym,* Blistering Cerate.—Made by mixing 32 Gm. of powdered Cantharides with 15 Cc. of Liquid Petrolatum, and setting the mixture aside, well covered, in a warm place for forty-eight hours. Then adding to it the following substances, which have been previously melted: 18 Gm. of Rosin, 18 Gm. of Yellow Wax, and 17 Gm. of Lard. While still warm, the liquid is strained through muslin, and then kept liquefied by means of a water-bath for one hour, it being stirred occasionally. Finally, the liquefied mixture is removed from the water-bath and stirred until it begins to congeal. *Used* as an epispastic.

Ceratum Plumbi Subacetatis (*Cerate of Lead Subacetate*). *Synonym,* Goulard's Cerate.—Made by incorporating by trituration 20 Gm. of Solution of Lead Subacetate, with 20 Gm. of melted Wool Fat contained in a warm mortar, and then adding 20 Gm. of melted Paraffin, and 38 Gm. of melted White Petrolatum in which 2 Gm. of Camphor has been dissolved, and, lastly, thoroughly mixing until a homogeneous cerate is formed.

Used as a local application to allay active inflammation of the skin.

Ceratum Resinæ (*Rosin Cerate*). *Synonym,* Basilicon Ointment.—Made by melting 35 Gm. of Rosin, adding 15 Gm. of Yellow Wax, and 50 Gm. of Lard, continuing the heat until liquefied, straining through muslin, and stirring occasionally while it congeals. In cold weather, 53 Gm. of Lard, and 12 Gm. of Yellow Wax may be used.

Used locally as a stimulating dressing for *indolent ulcers, chilblains,* etc. It enters into the composition of *Turpentine Liniment.* The cerate furnishes a convenient excipient for making pills of potassium permanganate.

Ceratum Resinæ Compositum (*Compound Rosin Cerate*). *Synonym,* Deshler's Salve.—Made by melting 22.5 Gm. of Rosin, 22.5 Gm. of Yellow Wax, 30 Gm. of Prepared Suet, and 11.5 Gm. of Turpentine, adding 13.5 Gm. of Linseed Oil; continuing the heat until the mixture is liquefied, straining it through coarse muslin, and then stirring until it congeals.

Used as a stimulating dressing for *chilblains, indolent ulcers,* and similar deep-seated chronic *inflammations of the skin.*

CHARTÆ—Papers

Charta Sinapis (*Mustard Paper*).—Charta sinapis, mustard paper, commonly known as mustard leaves, is made by percolating 10 Gm. of ground Black Mustard with Petroleum Benzin to remove its fixed oil, drying and mixing it with a solution of 10 Gm. of Rubber in 100 Cc. each of Carbon Disulphide and Petroleum Benzin to form a semiliquid magma; then applying the magma, by means of a suitable brush, to one side of a piece of rather thick Well-sized Paper, so as to cover it completely, and allowing the surface to dry. A surface of sixty square centimeters should contain about 4 Gm. of Black Mustard deprived of oil. Mustard paper is applied by dipping it into warm water for a few seconds, covering the medicated surface with a piece of old, thin muslin, and then applying it to the skin.

COLLODIA—Collodions

Collodion is a thick liquid intended for local application, made by dissolving pyroxylin in a mixture of 3 parts of ether and 1 part of alcohol. When locally applied to the skin by means of a brush or swab, the ether and alcohol rapidly evaporate, leaving a dry film, which acts as a protecting dressing. Collodion dressing may be removed by the local use of a mixture of 3 volumes of ether and 1 volume of alcohol. Collodions should be kept in a cool place, remote from light or fire. Four collodions are official, all being solutions of medicinal substances in pyroxylin, ether, and alcohol.

Collodium (*Collodion*).—Made by adding 75 Cc. of Ether to 4 Gm. of Pyroxylin, contained in a suitable bottle, allowing it to stand for fifteen minutes; then adding 25 Cc. of Alcohol, and shaking the bottle until the pyroxylin is dissolved. The bottle is then corked tightly, and set aside until the liquid becomes clear. Finally, decant the clear portion from any sediment, which may have deposited, and transferring it to a bottle, which should be well corked and sealed. *Used* externally.

Collodium Cantharidatum (*Cantharidal Collodion*). *Synonym*, Blistering Collodion. Made by packing 60 Gm. of powdered Cantharides firmly in a cylindrical percolator, and gradually pouring Chloroform on it until the powder is exhausted. Recover the chloroform by distillation from a water-bath, and evaporate the residue in a tared evaporating dish on a water-bath until it weighs 15 Gm. Dissolving this in 85 Gm. of Flexible Collodion, and setting it aside in a securely corked bottle, and in a cool place to become clear by settling. Finally, pouring off the clear portion from any sediment which may have deposited, and transferring it to bottles, which should be well corked and sealed. *Used* externally.

Collodium Flexile (*Flexible Collodion*).—Made by weighing the following substances into a tared bottle: 92 Gm. of Collodion, 5 Gm. of Canada Turpentine, and 3 Gm. of Castor Oil, and mixing them thoroughly. *Used* externally.

Collodium Stypticum (*Styptic Collodion*).—Made by introducing 20 Gm. of Tannic Acid, 5 Cc. of Alcohol, and 25 Cc. of Ether into a graduated bottle, agitating the mixture until the tannic acid is thoroughly incorporated and partially dissolved, then adding enough Collodion to make up the volume to 100 Cc., and shaking occasionally until the tannic acid is completely dissolved. *Used* externally.

CONFECTIONES—Confections

Confections, also known as *Conserves*, or *Electuaries*, are solid, pasty preparations consisting of vegetable drugs made into a soft mass with sugar or honey. There are but two official confections. The confection of rose, used as an excipient, and the confection of senna, used as a purgative.

Confectio Rosæ (*Confection of Rose*).—Made by rubbing 8 Gm. of powdered Red Rose with 16 Cc. of Stronger Rose Water previously heated to 65° C. (149° F.), then gradually adding 64 Gm. of powdered Sugar and 12 Gm. of Clarified Honey, and beating the whole together until a uniform mass results.

Used as an excipient.

Dose.—Any desirable quantity.

Confectio Sennæ (*Confection of Senna*).—Made by digesting 16 Gm. of bruised Cassia Fistula, 10 Gm. of Tamarind, 7 Gm. of sliced Prunes, and 12 Gm. of bruised Fig, with 50 Cc. of Water in a covered vessel, by means of a water-bath, for three hours. Separating the coarser portions and rubbing the pulpy mass, first through a coarse hair sieve, and then through a muslin cloth. Mixing the residue with 15 Cc. of Water, and having digested the mixture for a short time, treating it as before, and adding the product to the pulpy mass first obtained.

Then, by means of a water-bath, dissolving the Sugar in the pulpy liquid, and evaporating the whole in a tared vessel, until it weighs 89.5 Gm. Lastly adding 10 Gm. of Powdered Senna, and 0.5 Cc. of Oil of Coriander, and incorporating them thoroughly with the other ingredients while they are yet warm.

Dose.—8 Gm.; 2 ʒ.

DECOCTA—Decoctions

Decoctions are liquid preparations made by boiling vegetable substances in water, and then straining. Like other aqueous liquids, they decompose if long kept, and should be freshly prepared when wanted.

At one time very popular, they have been almost entirely supplanted by tinctures and fluidextracts, which keep well, are concentrated, and are, therefore, less troublesome and disagreeable to administer. There are no official decoctions, but the U. S. P. gives the following general formula for making ordinary decoctions, when the strength is not specified by the physician.

Take of the substance, coarsely comminuted, 50 Gm.; Water, a sufficient quantity to make 1000 Cc.

Introduce the substance into a suitable vessel provided with a cover, pour upon it 1000 Cc. of cold water, cover it well, and boil for fifteen minutes. Then allow it to cool to about 40° C. (104° F.), express, strain the expressed liquid, and pass enough cold water through the strainer to make the product measure 1000 Cc.

Caution.—The strength of decoctions of energetic or powerful substances should be especially prescribed by the physician.

ELIXIRIA—Elixirs

Elixirs are aromatic, sweetened, alcoholic liquids. Being strongly alcoholic, Adjuvant Elixir and Aromatic Elixir are good vehicles in which to administer many of the tinctures and fluidextracts, but are not good solvents for the various salts, and form a chemical incompatibility with hydrated chloral. The Elixir of the Phosphates of Iron, Quinine, and Strychnine, although intensely bitter, somewhat astringent and constipating, is so extensively employed that its admission as an official preparation in the U. S. Pharmacopœia became necessary.

The following elixirs are official:

Elixir Adjuvans (*Adjuvant Elixir*).—Made by thoroughly mixing 12 Cc. of Fluidextract of Glycyrrhiza with 88 Cc. of Aromatic Elixir to make 100 Cc. of elixir. *Used* as a vehicle.

Elixir Aromaticum (*Aromatic Elixir*). *Synonym,* Elixir of Orange.—Made by adding 23.8 Cc. of Alcohol to 1.2 Cc. of Compound Spirit of Orange, and then adding 37.5 Cc. of Syrup in several portions, agitating after each addition, and afterward adding in the same manner 37.5 Cc. of Distilled Water. To this liquid is added 3 Gm. of Purified Talc, mixing it intimately and then filtering through a well-wetted filter, returning the first portion of the filtrate until a transparent liquid is obtained. Lastly, washing the filter with a mixture of 1 volume of Alcohol and 3 volumes of Distilled Water to obtain 100 Cc. of the elixir. *Used* as an agreeable vehicle, but not a good solvent for the various official salts.

Elixir Ferri, Quininæ et Strychninæ Phosphatum (*Elixir of the Phosphates of Iron, Quinine, and Strychnine*).—Made by dissolving 0.875 Gm. of Quinine and 0.0275 Gm. of Strychnine in 6 Cc. of Alcohol, then adding 0.2 Cc. of Phosphoric Acid and 35 Cc. of Aromatic Elixir. To 0.9 Gm. of Ammonium Carbonate contained in a suitable vessel, 2.865

Gm. of Acetic Acid is added, and when solution is complete, neutralizing with Ammonia Water, and adding enough Distilled Water to make the product measure 5 Cc. The solution of ammonium acetate is then mixed with the acidified solution of the alkaloids, and enough aromatic elixir added to make the liquid measure 88 Cc. Dissolve 1.75 Gm. of Soluble Ferric phosphate in 3 Cc. of Distilled Water by the aid of a gentle heat, and if the solution be acid to litmus paper neutralizing exactly with Ammonia Water, and adding enough Aromatic Elixir to make the product measure 12 Cc. Finally, mixing the two solutions, and filtering, if necessary. Each fluidram (4 Cc.) of the elixir contains about 1 grain (0.064 Gm.) of *ferric phosphate;* ½ grain (0.032 Gm.) of *quinine;* and $\frac{1}{6\frac{1}{4}}$ grain (0.001 Gm.) of *strychnine.*

Dose.—2 to 8 Cc.; ½ to 2 f℥.

EMPLASTRA—Plasters

Ready spread plasters are more extensively used than the official ones, which are a class of solid preparations intended for external use and are of such consistency that to be spread upon muslin, buckskin, chamois skin, sheep skin, etc., they must be softened or melted by the aid of heat, and after cooling when applied to the body do not melt and run, but adhere to the skin. They are used to protect cut and raw surfaces, to hold cut surfaces together, to fasten dressings to the body, to redden or blister the skin, and also for obtaining systemic effects through absorption from the skin of active medicinal agents entering into their compositions.

The official plasters are as follows:

Emplastrum Adhesivum (*Adhesive Plaster*).—Made by melting 2 Gm. of Rubber at a temperature not exceeding 150° C. (302° F.), adding 2 Gm. of Petrolatum, and continuing the heat until the rubber is dissolved. Then adding 96 Gm. of Lead Plaster to the hot mixture, continuing the heat until it becomes a liquid, allowing it to cool, and stirring until it stiffens.

Emplastrum Belladonnæ (*Belladonna Plaster*).—Made by melting 70 Gm. of Adhesive Plaster on a water-bath, adding to it 30 Gm. of the Extract of Belladonna Leaves, softened by the heat of a water-bath, and continuing the heat, stirring constantly until the mixture is perfectly homogeneous; then allowing it to cool. It should contain not less than 0.38 per cent., nor more than 0.42 per cent. of mydriatic alkaloids.

Emplastrum Capsici (*Capsicum Plaster*).—Made by applying 0.25 Gm. of the Oleoresin of Capsicum to the surface of Adhesive Plaster, spread upon fabric by means of a brush so as to form a thin coating of an area fifteen centimeters square, leaving a margin around the sides.

Emplastrum Hydrargyri (*Mercurial Plaster*).—Made by triturating 30 Gm. of Mercury with 1 Gm. of Oleate of Mercury until the former is thoroughly divided, and then adding 10 Gm. of Hydrous Wool-Fat,

and continuing the trituration until globules of mercury are no longer visible. The mixture is then added to 59 Gm. of Lead Plaster, which has previously been melted in a tared dish, and incorporating it thoroughly, adding, if necessary, sufficient lead plaster to make the product weigh 100 Gm.

Emplastrum Opii (*Opium Plaster*).—Made by rubbing 6 Gm. of Extract of Opium with 8 Cc. of Water until it is uniformly soft, and then adding to it 90 Gm. of Adhesive Plaster, which has been previously melted in a tared dish on a water-bath, and continuing the heat with constant stirring until the product weighs 100 Gm.

Emplastrum Plumbi (*Lead Plaster*).—Made by dissolving 100 Gm. of Soap in 350 Cc. of Hot Water, and straining the solution. Dissolving 60 Gm. of Lead Acetate in 250 Cc. of Hot Water, and at once filtering the solution into the warm soap solution, stirring constantly. When the precipitate has subsided the liquid is decanted, and the precipitate thoroughly washed with hot water. The mixture is then transferred to a warm slab, kneaded thoroughly to free it from water, and finally rolled into cylindrical forms, which should be wrapped in paraffin paper.

Emplastrum Saponis (*Soap Plaster*).—Made by rubbing 10 Gm. of Soap with enough Water to reduce it to a semiliquid state, then mixing it with 90 Gm. of Lead Plaster, previously melted, incorporating thoroughly by stirring and evaporating to the proper consistency.

EMULSA—Emulsions

Emulsions are liquid preparations in which oils, oleoresins, resins, gum resins, or chloroform are suspended in water by means of mucilaginous substances. Acacia, tragacanth, and the yolk of eggs are the substances most frequently employed as emulsifying agents in making extemporaneous emulsions. To make seed, or natural gum-resin emulsions, the seed or gum-resin is triturated with water and strained through muslin. Alkalies and pancreatin assist in the emulsification of fats or oils, while acids destroy emulsions made with alkalies. Alcohol, except in small quantities, added to emulsions precipitates gums and destroys emulsions made with them. To make an emulsion with fixed oils, from 1 to 2 drams of powdered acacia should be employed to each fluidounce of oil, while emulsions made from volatile oils require from 2 to 4 drams of acacia to each fluidounce of oil.

The following are the official emulsions:

Emulsum Amygdalæ (*Emulsion of Almond*). *Synonym,* Milk of Almonds.

Ingredients.—Sweet Almond, 6 Gm.; Acacia, 1 Gm.; Sugar, 3 Gm.; Water, a sufficient quantity to make 100 Cc. This emulsion should be strained.

Dose.—4 to 60 Cc.; 1 to 2 f℥.

Emulsum Asafœtidæ (*Emulsion of Asafetida*). *Synonym,* Milk of Asafetida.

Ingredients.—Asafetida, 4 Gm.; Water, a sufficient quantity to make 100 Cc. To be strained.

Dose.—15 to 30 Cc.; 4 to 8 f℥.

Emulsum Chloroformi (*Emulsion of Chloroform*).

Ingredients.—Chloroform, 4 Cc.; Expressed Oil of Almond, 6 Cc.; Tragacanth, 1 Gm.; Water, a sufficient quantity to make 100 Cc.

Dose.—4 to 16 Cc.; 1 to 4 f℥.

Emulsum Olei Morrhuæ (*Emulsion of Cod-liver Oil*).

Ingredients.—Cod-liver Oil, 50 Cc.; Acacia, 12.5 Gm.; Syrup, 10 Cc.; Oil of Gaultheria, 0.4 Cc.; Water, a sufficient quantity to make 100 Cc.

Dose.—8 to 16 Cc.; 2 to 4 f℥.

Emulsum Olei Morrhuæ Cum Hypophosphitibus (*Emulsion of Cod-liver Oil with Hypophosphites*).

Ingredients.—Cod-liver Oil, 50 Cc.; Acacia, 12.5 Gm.; Calcium Hypophosphite, 1 Gm.; Potassium Hypophosphite, 0.5 Gm.; Sodium Hypophosphite, 0.5 Gm.; Syrup, 10 Cc.; Oil of Gaultheria, 0.4 Cc.; Water, a sufficient quantity to make 100 Cc.

Dose.—8 to 16 Cc.; 2 to 4 f℥.

Emulsum Olei Terebinthinæ (*Emulsion of Turpentine*).

Ingredients.—Rectified Oil of Turpentine, 15 Cc.; Expressed Oil of Almond, 5 Cc.; Syrup, 25 Cc.; Acacia, 15 Gm.; Water, a sufficient quantity to make 100 Cc.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

EXTRACTS—Extracts

Extracts are solid or semisolid preparations made by extracting the active ingredients of vegetable substances by the process of maceration and percolation, and evaporating the residue to a soft mass to a pilular consistency, or to dryness. Some have small quantities of glycerin added to them to prevent them from becoming dry and hard. "Aqueous," "alcoholic," "ethereal," "acetic," or "ammoniated extracts" are terms sometimes employed, and signify that water, alcohol, ether, acetic acid, or spirit of ammonia has been employed as a menstruum in the process of their manufacture. Extracts are especially suitable for administering in pill form, as they are mostly energetic remedies; their doses are small, and they are of such consistency that they can be readily made into pills.

In the Eighth Decennial Revision of the *United States Pharmacopœia,* the extracts made from belladonna leaves, colchicum corm, hyoscyamus, nux vomica, opium, physostigma, and stramonium are standardized to contain a definite percentage of active principles from the drugs of which they are made.

The following are the official extracts with their doses:

Extractum Aloes (*Extract of Aloes*).—A *dry* extract.

Dose.—0.03 to 0.3 Gm.; $\frac{1}{2}$ to 5 grains.

Extractum Belladonnæ Foliorum (*Extract of Belladonna Leaves*).—An extract of *pilular consistency*, containing 1.4 per cent. of mydriatic alkaloids from belladonna leaves.

Dose.—0.01 to 0.016 Gm.; $\frac{1}{6}$ to $\frac{1}{4}$ grain.

Extractum Cannabis Indicæ (*Extract of Indian Cannabis*).—An extract of a *pilular consistency*.

Dose.—0.004 to 0.03 Gm.; $\frac{1}{16}$ to $\frac{1}{2}$ grain.

Extractum Cimicifugæ (*Extract of Cimicifuga*).—A *dry* extract.

Dose.—0.06 to 0.3 Gm.; 1 to 5 grains.

Extractum Colchici Cormi (*Extract of Colchicum Corm*).—An extract of *pilular consistency*, containing 1.4 per cent. of colchicine.

Dose.—0.03 to 0.1 Gm.; $\frac{1}{2}$ to 2 grains.

Extractum Colocynthidis (*Extract of Colocynth*).—A *dry* extract.

Dose.—0.06 to 0.3 Gm.; 1 to 5 grains.

Extractum Colocynthidis Compositum (*Compound Extract of Colocynth*).—A *dry* extract. Contains 16 per cent. of extract of colocynth; 50 per cent. of purified aloes; 6 per cent. of cardamom; 14 per cent. of resin of scammony; and 14 per cent. of soap.

Dose.—0.3 to 1.2 Gm.; 5 to 20 grains.

Extractum Digitalis (*Extract of Digitalis*).—An extract of a *pilular consistency*.

Dose.—0.01 to 0.016 Gm.; $\frac{1}{6}$ to $\frac{1}{4}$ grain.

Extractum Ergotæ (*Extract of Ergot*).—A *soft* extract.

Dose.—0.06 to 0.6 Gm.; 1 to 10 grains.

Extractum Euonymi (*Extract of Euonymus*).—A *dry* extract.

Dose.—0.2 to 0.6 Gm.; 3 to 10 grains.

Extractum Gentianæ (*Extract of Gentian*).—An extract of a *pilular consistency*.

Dose.—0.06 to 0.6 Gm.; 1 to 10 grains.

Extractum Glycyrrhizæ (*Extract of Glycyrrhiza*). *Synonym*, Extract of Licorice.—A *dry* extract in flattened *cylindrical* rolls.

Dose.—0.3 to 6.5 Gm.; 5 to 100 grains.

Extractum Glycyrrhizæ Purum (*Pure Extract of Glycyrrhiza*).—An extract of a *pilular consistency*.

Dose.—0.3 to 6.5 Gm.; 5 to 100 grains.

Extractum Hæmatoxyli (*Extract of Hematoxylon*). *Synonym*, Extract of Logwood.—A *dry* extract.

Dose.—0.5 to 2 Gm.; 8 to 30 grains.

Extractum Hyoscyami (*Extract of Hyoscyamus*).—An extract of a *pilular consistency*, containing 0.3 per cent. of mydriatic alkaloids from hyoscyamus.

Dose.—0.03 to 0.12 Gm.; $\frac{1}{2}$ to 2 grains.

Extractum Krameriæ (*Extract of Krameria*).—A *dry* extract.

Dose.—0.3 to 0.6 Gm.; 5 to 10 grains.

Extractum Leptandræ (*Extract of Leptandra*).—A *dry* extract.

Dose.—0.06 to 0.5 Gm.; 1 to 8 grains.

Extractum Malti (*Extract of Malt*).—An extract of the *consistency of honey.*

Dose.—15 to 30 Cc.; ½ to 1 f℥.

Extractum Nucis Vomicæ (*Extract of Nux Vomica*).—A *dry* extract containing 5 per cent. of strychnine.

Dose.—0.01 to 0.03 Gm.; $\frac{1}{6}$ to $\frac{1}{2}$ grain.

Extractum Opii (*Extract of Opium*).—A *dry* extract, containing 20 per cent. of morphine.

Dose.—0.01 to 0.06 Gm.; $\frac{1}{4}$ to 1 grain.

Extractum Physostigmatis (*Extract of Physostigma*).—A *dry* extract, containing 2 per cent. of ether-soluble alkaloids from physostigma.

Dose.—0.004 to 0.008 Gm.; $\frac{1}{16}$ to $\frac{1}{8}$ grains.

Extractum Quassiæ (*Extract of Quassia*).— A *dry* extract.

Dose.—0.06 to 0.2 Gm.; 1 to 3 grains.

Extractum Rhamni Purshianæ (*Extract of Cascara Sagrada*).—A *dry* extract.

Dose.—0.12 to 0.3 Gm.; 2 to 5 grains.

Extractum Rhei (*Extract of Rhubarb*).—An extract of a *pilular consistency.*

Dose.—0.12 to 0.3 Gm.; 2 to 5 grains.

Extractum Scopolæ (*Extract of Scopola*).—An extract of a *pilular consistency,* containing 2 per cent. of mydriatic alkaloids.

Dose.—0.01 to 0.02 Gm.; $\frac{1}{6}$ to $\frac{1}{3}$ grain.

Extractum Stramonii (*Extract of Stramonium*).—An extract of a *pilular consistency,* containing 1.4 per cent. of mydriatic alkaloids, from stramonium.

Dose.—0.01 to 0.02 Gm.; $\frac{1}{6}$ to $\frac{1}{3}$ grains.

Extractum Sumbul (*Extract of Sumbul*).—An extract of a *pilular consistency.*

Dose.—0.12 to 0.3 Gm.; 2 to 5 grains.

Extractum Taraxaci (*Extract of Taraxacum*).—An extract of a *pilular consistency.*

Dose.—0.3 to 2 Gm.; 5 to 30 grains.

FLUIDEXTRACTA—Fluidextracts

Fluidextracts are liquid, alcoholic preparations of uniform and definite strength, made by a process whereby each cubic centimeter contains the active ingredients of 1 Gm. of the crude drug from which

it is made. The fluidextracts are all made by the process of percolation, the menstruum being alcohol, alcohol and water, or alcohol, water, and glycerin. The fluidextracts of nux vomica, lobelia, sanguinaria and squill, and ergot are made with a menstruum containing a small percentage of acetic acid. The fluidextract of glycyrrhiza contains 5 per cent of ammonia water; the aromatic fluidextract of cascara is alkalinized by the use of magnesium oxide; the fluidextract of senega is alkalinized by the use of 3 per cent. of solution of potassium hydroxide in the menstruum used to exhaust the drug; and the fluidextract of taraxacum is alkalinized by the addition to it of about 5 per cent. of solution of sodium hydroxide. As a rule, the fluidextracts, especially those containing resinous substances, are precipitated by the addition of water to them, and, in writing prescriptions containing them, the best vehicles are aromatic elixir, port wine, sherry wine, and syrups. Fluidextracts containing a large percentage of resins should be prescribed alone, in alcohol, or made into an emulsion with acacia. In other instances in which the quantity of the fluidextract is small and the quantity of water, syrup, or other aqueous liquids is great, no ill results can follow the use of mixtures made by adding the fluidextract to the aqueous liquid and dispensing with a shake label. In the recent *United States Pharmacopœia*, the following fourteen fluidextracts were standardized: Aconite, belladonna root, cinchona, coca, colchicum seed, conium, guarana, hydrastis, hyoscyamus, ipecac, nux vomica, pilocarpus, scopola, stramonium. Although no general formula is given in the present *United States Pharmacopœia* for making fluidextract, the following furnishes a description of the process as usually employed:

Of the drug in powdered form 1000 Gm.; menstruum a sufficient quantity to make 1000 Cc.; moisten the powder with the menstruum (a definite quantity is usually stated), and pack it firmly in a cylindrical percolator, then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice and, having covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding menstruum; reserve the first 800 Cc. (sometimes a smaller quantity) and continue the percolation, gradually adding the menstruum, until the drug is exhausted. The last portion is evaporated at a temperature not exceeding 50° C. (122° F.), to a soft extract, dissolved in the reserve portion, and enough menstruum added to make the fluidextract measure 1000 Cc.

Fluidextractum Aconiti (*Fluidextract of Aconite*).—Each 100 Cc. should contain 0.4 Gm. of aconitine.

Dose.—0.03 to 0.12 Cc.; ½ to 2 minims.

Fluidextractum Apocyni (*Fluidextract of Apocynum*).

Dose.—0.3 to 1 Cc.; 5 to 15 minims.

Fluidextractum Aromaticum (*Aromatic Fluidextract*).

Dose.—0.6 to 4 Cc.; 10 to 60 minims.

Fluidextractum Aurantii Amari (*Fluidextract of Bitter Orange Peel*).
Dose.—1 to 1.8 Cc.; 15 to 30 minims.

Fluidextractum Belladonnæ Radicis (*Fluidextract of Belladonna Root*).—Each 100 Cc. should contain 0.4 Gm. of mydriatic alkaloids from belladonna root.
Dose.—0.06 to 0.12 Cc.; 1 to 2 minims.

Fluidextractum Berberidis (*Fluidextract of Berberis*).
Dose.—1 to 4 Cc.; 15 to 60 minims.

Fluidextractum Buchu (*Fluidextract of Buchu*).
Dose.—2 to 4 Cc.; ½ to 1 f℥.

Fluidextractum Calami (*Fluidextract of Calamus*).
Dose.—0.3 to 2 Cc.; 5 to 30 minims.

Fluidextractum Calumbæ (*Fluidextract of Calumba*).
Dose.—1 to 4 Cc.; 15 to 60 minims.

Fluidextractum Cannabis Indicæ (*Fluidextract of Indian Cannabis*).—Contains a large percentage of resin which is readily precipitated by water. May be prescribed in a mixture with alcohol, in an emulsion, or still better without combination.
Dose.—0.06 to 0.2 Cc.; 1 to 3 minims.

Fluidextractum Capsici (*Fluidextract of Capsicum*).—Contains a large percentage of oils and resin.
Dose.—0.6 to 0.2 Cc.; 1 to 3 minims.

Fluidextractum Chimaphilæ (*Fluidextract of Chimaphila*).
Dose.—2 to 4 Cc.; ½ to 1 f℥.

Fluidextractum Chiratæ (*Fluidextract of Chirata*).
Dose.—2 to 4 Cc.; ½ to 1 f℥.

Fluidextractum Cimicifugæ (*Fluidextract of Cimicifuga*).—Readily precipitated by water.
Dose.—0.6 to 2 Cc.; 10 to 30 minims.

Fluidextractum Cinchonæ (*Fluidextract of Cinchona*).—Each 100 Cc. should contain 4 Gm. of anhydrous ether-soluble alkaloids from cinchona.
Dose.—1 to 2 Cc.; 15 to 30 minims.

Fluidextractum Cocæ (*Fluidextract of Coca*).—Each 100 Cc. should contain 0.5 Gm. of ether-soluble alkaloids from coca.
Dose.—2 to 8 Cc.; ½ to 2 f℥.

Fluidextractum Colchici Seminis (*Fluidextract of Colchicum Seed*).—Each 100 Cc. should contain 0.4 Gm. of colchicine.
Dose.—0.12 to 0.3 Cc.; 2 to 5 minims.

Fluidextractum Conii (*Fluidextract of Conium*).—The menstruum used in exhausting the drug is diluted alcohol, 98 parts, and acetic acid, 2 parts. Each 100 Cc. contains 0.45 Gm. of coniine.
Dose.—0.12 to 0.3 Cc.; 2 to 5 minims.

Fluidextractum Convallariæ (*Fluidextract of Convallaria*).
Dose.—0.2 to 0.5 Cc.; 3 to 8 minims.

Fluidextractum Cubebæ (*Fluidextract of Cubeb*).—Contains a large percentage of resins and oils.

Dose.—0.6 to 4 Cc.; 10 to 60 minims.

Fluidextractum Cypripedii (*Fluidextract of Cypripedium*).

Dose.—0.3 to 2 Cc.; 5 to 30 minims.

Fluidextractum Digitalis (*Fluidextract of Digitalis*).

Dose.—0.06 to 0.12 Cc.; 1 to 2 minims.

Fluidextractum Ergotæ (*Fluidextract of Ergot*).—Menstruum used for exhausting the drug, diluted alcohol, 98 parts, and acetic acid, 2 parts.

Dose.—2 to 4 Cc.; ½ to 1 f℥.

Fluidextractum Eriodictyi (*Fluidextract of Eriodictyon*). *Synonym,* Fluidextract of Yerba Santa.—Contains such a large percentage of resins that it cannot be prescribed in any aqueous liquids except by means of emulsification.

Dose.—1 to 4 Cc.; 15 to 60 minims.

Fluidextractum Eucalypti (*Fluidextract of Eucalyptus*).

Dose.—0.6 to 4 Cc.; 10 to 60 minims.

Fluidextractum Euonymi (*Fluidextract of Euonymus*).—Contains a large percentage of resins.

Dose.—0.3 to 1 Cc.; 5 to 15 minims.

Fluidextractum Eupatorii (*Fluidextract of Eupatorium*). *Synonym,* Fluidextract of Bone Set.

Dose.—2 to 4 Cc.; ½ to 1 f℥.

Fluidextractum Frangulæ (*Fluidextract of Frangula*).

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

Fluidextractum Gelsemii (*Fluidextract of Gelsemium*).

Dose.—0.06 to 0.2 Cc.; 1 to 3 minims.

Fluidextractum Gentianæ (*Fluidextract of Gentian*).

Dose.—2 to 4 Cc.; ½ to 1 f℥.

Fluidextractum Geranii (*Fluidextract of Geranium*).

Dose.—2 to 4 Cc.; ½ to 1 f℥.

Fluidextractum Glycyrrhizæ (*Fluidextract of Glycyrrhiza*).—Menstruum of alcohol, water, glycerin, and ammonia water. The fluidextract is frequently added to aqueous liquids. Acids precipitate its glycyrrhizin.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Fluidextractum Granati (*Fluidextract of Pomegranate*).

Dose.—2 to 4 Cc.; 30 to 60 minims.

Fluidextractum Grindeliæ (*Fluidextract of Grindelia*).—Readily precipitated by water.

Dose.—2 to 4 Cc.; ½ to 1 f℥.

Fluidextractum Guaranæ (*Fluidextract of Guarana*).—Each 100 Cc. contains 3.5 Gm. of the alkaloids from guarana.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Fluidextractum Hamamelidis Foliorum (*Fluidextract of Hamamelis Leaves*).

Dose.—2 to 4 Cc.; ½ to 1 f℥.

Fluidextractum Hydrastis. (*Fluidextract of Hydrastis*).—Each 100 Cc. contains 2 Gm. of hydrastine.

Dose.—2 to 4 Cc.; ½ to 1 f℥.

Fluidextractum Hyoscyami (*Fluidextract of Hyoscyamus*).—Each 100 Cc. contains 0.075 Gm. of alkaloids from hyoscyamus.

Dose.—0.3 to 0.6 Cc.; 5 to 10 minims.

Fluidextractum Ipecacuanhæ (*Fluidextract of Ipecac*).—Each 100 Cc. contains 1.5 Gm. of the alkaloids from ipecac.

Dose.—0.06 to 0.12 Cc.; 1 to 2 minims.

Fluidextractum Krameriæ (*Fluidextract of Krameria*).

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

Fluidextractum Leptandræ (*Fluidextract of Leptandra*).—Readily precipitated by water.

Dose.—0.3 to 2 Cc.; 5 to 30 minims.

Fluidextractum Lobeliæ (*Fluidextract of Lobelia*).

Dose.—0.3 to 1 Cc.; 5 to 15 minims.

Fluidextractum Lupulini (*Fluidextract of Lupulin*).—Cannot be prescribed in aqueous liquids except by means of emulsification.

Dose.—0.6 to 1 Cc.; 10 to 15 minims.

Fluidextractum Matico (*Fluidextract of Matico*).

Dose.—2 to 4 Cc.; ½ to 1 f℥.

Fluidextractum Mezerei (*Fluidextract of Mezereum*)—Used externally.

Fluidextractum Nucis Vomicæ (*Fluidextract of Nux Vomica*).—Each 100 Cc. contain 1 Gm. of strychnine.

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

Fluidextractum Pareiræ (*Fluidextract of Pareira*).—Readily precipitated by water.

Dose.—2 to 4 Cc.; ½ to 1 f℥.

Fluidextractum Phytolaccæ (*Fluidextract of Phytolacca*).

Dose.—As emetic, 1 Cc.; 15 minims; as alterative, 0.1 Cc.; 1½ minims.

Fluidextractum Pilocarpi (*Fluidextract of Pilocarpus*).—Each 100 Cc. contain 0.4 Gm. of alkaloids from pilocarpus.

Dose.—2 to 4 Cc.; ½ to 1 f℥.

Fluidextractum Podophylli (*Fluidextract of Podophyllum*).—Readily precipitates upon the addition of water.

Dose.—0.12 to 1 Cc.; 2 to 15 minims.

Fluidextractum Pruni Virginianæ (*Fluidextract of Wild Cherry*).—Readily miscible with syrups.

Dose.—2 to 4 Cc.; ½ to 1 f℥.

Fluidextractum Quassiæ (*Fluidextract of Quassia*).—Miscible with water with only slight precipitation.

Dose.—0.3 to 0.6 Cc.; 5 to 10 minims.

Fluidextractum Quercus (*Fluidextract of Quercus*).—Miscible with water with only slight precipitation.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

Fluidextractum Quillajæ (*Fluidextract of Quillaja*).—When shaken with water it forms a soapy foam.

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

Fluidextractum Rhami Purshianæ (*Fluidextract of Cascara Sagrada*).

Dose.—1 to 2 Cc.; 15 to 30 minims.

Fluidextractum Rhamni Purshianæ Aromaticum (*Aromatic Fluidextract of Cascara Sagrada*).—Bitter taste redeveloped by acids.

Dose.—1 to 2 Cc.; 15 to 30 minims.

Fluidextractum Rhei (*Fluidextract of Rhubarb*).

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

Fluidextractum Rhois Glabræ (*Fluidextract of Rhus Glabra*).—Miscible with water with only moderate precipitation.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

Fluidextractum Rosæ (*Fluidextract of Rose*).—Miscible with aqueous liquids with only slight precipitation.

Dose.—2 to 4 Cc.; ½ to 1 f℥.

Fluidextractum Rubi (*Fluidextract of Rubus*).

Dose.—2 to 4 Cc.; ½ to 1 f℥.

Fluidextractum Sabinæ (*Fluidextract of Savin*).—Readily precipitated by water.

Dose.—0.3 to 1 Cc.; 5 to 15 minims.

Fluidextractum Sanguinariæ (*Fluidextract of Sanguinaria*).—Made with a menstruum of 27.5 parts acetic acid and 72.5 parts of water. Readily miscible with water, incompatible with alkali carbonates.

Dose.—0.06 to 0.2 Cc.; 1 to 3 minims.

Fluidextractum Sarsaparillæ (*Fluidextract of Sarsaparilla*).—Miscible with syrupy liquids with slight precipitation.

Dose.—2 to 4 Cc.; ½ to 1 f℥

Fluidextractum Sarsaparillæ Compositum (*Compound Fluidextract of Sarsaparilla*).—Miscible with aqueous liquids, with slight precipitation.

Dose.—2 to 4 Cc.; ½ to 1 f℥.

Fluidextractum Scillæ (*Fluidextract of Squill*).—Made with a menstruum of 27.5 parts of acetic acid and 72.5 parts of water. Miscible with water.

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

Fluidextractum Scopolæ (*Fluidextract of Scopola*).—Each 100 Cc. contain 0.5 Gm. of the mydriatic alkaloids from scopola.

Dose.—0.06 to 0.2 Cc.; 1 to 3 minims.

Fluidextractum Scutellariæ (*Fluidextract of Scutellaria*).—Miscible with aqueous liquids, with slight precipitation.

Dose.—2 to 4 Cc.; ½ to 1 f℥.

Fluidextractum Senegæ (*Fluidextract of Senega*).—The drug is first percolated with a menstruum of solution of potassium hydroxide, 0.3 parts; alcohol, 6 parts; water, 3 parts, and the process finished with a menstruum of alcohol and water in the above proportions.

Dose.—0.6 to 1.2 Cc.; 10 to 20 minims.

Fluidextractum Sennæ (*Fluidextract of Senna*).

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Fluidextractum Serpentariæ (*Fluidextract of Serpentaria*).

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

Fluidextractum Spigeliæ (*Fluidextract of Spigelia*).

Dose.—2 to 4 Cc.; 30 to 60 minims.

Fluidextractum Staphisagriæ (*Fluidextract of Staphisagria*).

Dose.—0.06 to 0.12 Cc.; 1 to 2 minims.

Fluidextractum Stillingiæ (*Fluidextract of Stillingia*).

Dose.—0.6 to 4 Cc.; 10 to 60 minims.

Fluidextractum Stramonii (*Fluidextract of Stramonium*).—Each 100 Cc. contain 0.25 Gm. of the mydriatic alkaloids from stramonium.

Dose.—0.06 to 0.2 Cc.; 1 to 3 minims.

Fluidextractum Sumbul (*Fluidextract of Sumbul*).

Dose.—1 to 4 Cc.; 15 to 60 minims.

Fluidextractum Taraxaci (*Fluidextract of Taraxacum*).—The fluidextract contains about 5 per cent. of solution of sodium hydroxide.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Fluidextractum Tritici (*Fluidextract of Triticum*).—The drug is exhausted by percolating it with boiling water, evaporating, and adding 25 per cent. of alcohol as a preservative.

Dose.—8 to 15 Cc.; 2 to 4 f℥.

Fluidextractum Uvæ Ursi (*Fluidextract of Uva Ursi*).—Precipitated by water.

Dose.—4 to 15 Cc.; 1 to 4 f℥.

Fluidextractum Valerianæ (*Fluidextract of Valerian*).

Dose.—2 to 4 Cc.; ½ to 1 f℥.

Fluidextractum Veratri (*Fluidextract of Veratrum*).

Dose.—0.06 to 0.2 Cc.; 1 to 3 minims.

Fluidextractum Viburni Opuli (*Fluidextract of Viburnum Opulus*).

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Fluidextractum Viburni Prunifolii (*Fluidextract of Viburnum Prunifolium*).

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Fluidextractum Xanthoxyli (*Fluidextract of Xanthoxylum*).

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

Fluidextractum Zingiberis (*Fluidextract of Ginger*).—Resins and oil in the fluidextract are precipitated by water.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

GLYCERITA—Glycerites

Glycerites are liquid preparations consisting of solutions of medicinal substances in glycerin; glycerite of starch is gelatinous. In this class of preparations, advantage is taken of the valuable solvent action and the preservative and non-irritating properties of glycerin. The glycerite of tannic acid, boroglycerin, and phenol are convenient for making strong solutions of their active ingredients by their addition to water; the glycerite of the phosphates of iron, quinine, and strychnine, in the proportion of one part to three parts of syrup, is used to make the Syrup of the Phosphates of Iron, Quinine, and Strychnine, while the glycerite of starch is employed as a soothing, protecting dressing, and also as a basis for preparing extemporaneous, gelatinous, ointment-like preparations when it is desired to avoid the use of an unctuous or greasy preparation.

The following glycerites are official:

Glyceritum Acidi Tannici (*Glycerite of Tannic Acid*).—A thick, liquid preparation made by dissolving 20 Gm. of Tannic Acid in 80 Gm. of Glycerin, on a water-bath, by the aid of heat.

Dose.—0.6 to 4 Cc.; 10 to 60 minims.

Glyceritum Amyli (*Glycerite of Starch*).—A soft gelatinous mass, made by triturating 10 Gm. of Starch with 10 Cc. of Water to form a homogeneous mixture, transferring this to a porcelain dish, adding 80 Cc. of Glycerin, and heating the mixture to about 140° C. (284° F.), until a translucent jelly is formed. *Used* locally.

Glyceritum Boroglycerini (*Glycerite of Boroglycerin*).—A thick liquid preparation made by adding 31 Gm. of Boric Acid to 46 Gm. of Glycerin heated to 150° C. (302° F.), in a porcelain vessel, continuing the heat at the same temperature, frequently stirring, and breaking up the film which forms on the surface, until the weight of the mixture has been reduced to the weight of 50 Gm., then adding to it 50 Gm. of Glycerin, mixing thoroughly, and transferring it to a suitable vessel. *Used* locally.

Glyceritum Ferri, Quininæ et Strychninæ Phosphatum (*Glycerite of the Phosphates of Iron, Quinine, and Strychnine*).—Made by heating 8 Gm. Soluble Ferric Phosphate, with 20 Cc. of Water, in a porcelain dish, at a temperature not exceeding 70° C. (158° F.), until it is dissolved. Then adding 20 Cc. of Phosphoric Acid, with 0.08 Gm. of Strychnine; and 10.4 Gm. of Quinine; with a sufficient quantity of water to make the product measure 50 Cc., and stirring until solution is effected, and then mixing the solution with 50 Gm. of Glycerin to make 100 Cc. of the glycerite.

Used solely for preparing the syrup of the phosphates of iron, quinine, and strychnine by adding 25 Cc. of the glycerite to 75 Cc. of syrup.

Dose.—1 to 2 Cc.; 15 to 30 minims.

Glyceritum Hydrastis (*Glycerite of Hydrastis*).—Made by exhausting 100 Gm. of Hydrastis by percolating it with a menstruum of Alcohol; concentrating the liquid thus obtained by evaporation, pouring the thick, concentrated solution into 50 Cc. of Ice-cold Water, setting it aside for twenty-four hours and then filtering, and passing through the filter enough Cold Water to make the filtrate measure 50 Cc. To the filtrate 50 Gm. of Glycerin are added, and the whole mixed thoroughly.

Dose.—2 to 4 Cc.; 1 to 2 f℥.

Glyceritum Phenolis (*Glycerite of Phenol*).—Made by adding 20 Cc. of Liquefied Phenol to 80 Cc. of Glycerin, and stirring until they are thoroughly mixed.

Dose.—0.2 to 0.6 Cc.; 3 to 10 minims.

INFUSA—Infusions

Infusions are aqueous, liquid preparations made by treating vegetable substances with hot or cold water, and straining. At one time popular, they have been largely supplanted by tinctures, fluidextracts, and other concentrated preparations which keep well, and are effective in small doses. Infusions should be freshly prepared when wanted.

Three infusions are still official, and the *U. S. Pharmacopœia* gives the following general directions for making unofficial infusions from crude, vegetable drugs. The ordinary infusion, the strength of which is not directed by the physician, nor specified by the pharmacopœia, shall be prepared by the following formula:

The substance, coarsely comminuted, 50 Gm.; Boiling Water, 1000 Cc.; Water, a sufficient quantity to make 1000 Cc.

Introduce the Substance into a suitable vessel provided with a cover, pour upon it the Boiling Water, cover the vessel tightly, and let it stand for a half-hour in a warm place. Then strain with expression, and pass enough water through the strainer to make the Infusion measure 1000 Cc.

Caution.—The strength of Infusions of energetic or powerful substances should be specially prescribed by the physician.

The following infusions are official:

Infusum Digitalis (*Infusion of Digitalis*).—Pour 500 Cc. of boiling Water upon 15 Gm. of Digitalis, macerate for an hour, strain, and then add to the strained liquid 100 Cc. of Alcohol, 150 Cc. of Cinnamon Water, and enough cold water through the residue on the strainer to make 1000 Cc. of infusion. The alcohol is added as a preservative.

Dose.—4 to 15 Cc.; 1 to 4 f℥.

Infusum Pruni Virginianæ (*Infusion of Wild Cherry*).—Made by percolating 40 Gm. of ground Wild Cherry Bark with enough Cold Water to make 950 Cc. and adding 50 Cc. of Glycerin.

Dose.—15 to 30 Cc.; 4 to 8 f℥.

Infusum Sennæ Compositum (*Compound Infusion of Senna*). *Synonym,* Black Draught.—Made by pouring 800 Cc. of Boiling Water upon 60 Gm. of Senna, 120 Gm. of Manna, and 20 Gm. of Fennel, all contained in a suitable vessel; macerating for an hour, straining, expressing, dissolving 120 Gm. of Magnesium Sulphate in the liquid thus obtained, again straining and adding, through the strainer, enough Cold Water to make 1000 Cc. of infusion.

Dose.—60 to 240 Cc.; 2 to 8 f℥.

LINIMENTA—Liniments

Liniments are liquid preparations, consisting mostly of liquid soaps, intended for external application.

The following are official:

Linimentum Ammoniæ (*Ammonia Liniment*). *Synonym,* Hartshorn Liniment; Volatile Liniment.—Made by agitating the following substances in a bottle, which should be well stoppered; Ammonia Water, 35 Cc.; Alcohol, 5 Cc.; Cotton-seed Oil, 57 Cc.; Oleic Acid, 3 Cc.

This liniment is intended to be applied to the skin by friction. If poured upon flannel and applied to the surface of the body, it is liable to produce painful blisters.

Linimentum Belladonnæ (*Belladonna Liniment*).—Made by dissolving 5 Gm. of Camphor in a sufficient quantity of Fluidextract of Belladonna Root to make 100 Cc.

Linimentum Calcis (*Lime Liniment*). *Synonym,* Carron Oil.—Made by mixing and agitating 50 Cc. of Lime Water with 50 Cc. of Linseed Oil. *Used* as a local application in treating *burns.*

Linimentum Camphoræ (*Camphor Liniment*). *Synonym,* Camphorated Oil.—Made by introducing 20 Gm. of Camphor, and 80 Gm. of Cotton-seed Oil into a suitable flask and applying a gentle heat by means of a water-bath, loosely stoppering the flask during the operation, and agitating occasionally until the camphor is dissolved.

Linimentum Chloroformi (*Chloroform Liniment*).—Made by mixing and agitating 30 Cc. of Chloroform and 70 Cc. of Soap Liniment. To be applied by friction. A cloth saturated with this liniment should not be bound upon the surface of the skin, as it is liable to blister.

Linimentum Saponis (*Soap Liniment*).—Made by adding 6 Gm. of dried and Granulated Soap to 20 Cc. of Boiling Water, heat the mixture on a water-bath until a clear gelatinous mass results, and mixing this, while yet warm, with 50 Cc. of Alcohol, and stirring until solution is effected. Dissolving 4.5 Gm. of Camphor, 1 Cc. of Oil of Rosemary in 22.5 Cc. of Alcohol, by agitation in a bottle; adding this solution to the warm soap mixture, mixing thoroughly, and, if necessary, adding enough Water to make the product measure 100 Cc. After twenty-four hours, the liniment should be filtered.

Linimentum Saponis Mollis (*Liniment of Soft Soap*). *Synonym*, Tincture of Green Soap.—A strong, alkaline liquid made by dissolving 2 Cc. of Oil of Lavender Flowers in 30 Cc. of Alcohol, dissolving in this 65 Gm. of Soft Soap, filtering through paper after standing for twenty-four hours, and adding a sufficient quantity of Alcohol to make 100 Cc. of the liniment.

Linimentum Terebinthinæ (*Turpentine Liniment*).—A soft, solid, or semiliquid preparation, made by dissolving 65 Gm. of Rosin Cerate, previously melted in a dish on a water-bath, in 25 Gm. of Oil of Turpentine, and mixing them thoroughly.

LIQUORES—Solutions

The official solutions are aqueous solutions of non-volatile substances. They are *made* either by *simple solution* in hot or cold water, or by *chemical action*. The solutions contain energetic substances, and many of them are highly toxic. A majority are intended for internal administration, some for local application, while some are used solely for making other official preparations.

The following are official:

Liquor Acidi Arsenosi (*Solution of Arsenous Acid*).—A clear, colorless, odorless liquid, having an acidulous taste and an acid reaction, made by dissolving 1 Gm. of Arsenic Trioxide by boiling with 25 Cc. of Distilled Water acidulated with 5 Cc. of Diluted Hydrochloric Acid, then adding a sufficient quantity of Distilled Water to make 100 Cc. of liquid and filtering.

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

Liquor Ammonii Acetatis (*Solution of Ammonium Acetate*). *Synonym*, Spirit of Mindererus.—A clear, colorless liquid, of a mildly saline, acidulous taste, containing not less than 7 per cent. of ammonium acetate, with small amounts of acetic and carbonic acids. It should be freshly prepared when wanted by adding 5 Gm. of Ammonium Carbonate, which should be free from translucent pieces, to 100 Cc. of Diluted Acetic Acid, and stirring until dissolved.

Dose.—4 to 30 Cc.; 1 to 8 f℥.

Liquor Antisepticus (*Antiseptic Solution*).—A clear, colorless, or slightly yellowish, hydro-alcoholic solution having an agreeable, aromatic odor, and a cooling, aromatic taste, containing Boric Acid, 2 Gm.; Benzoic Acid, 0.1 Gm.; Thymol, 0.1 Gm.; Eucalyptol, 0.025 Gm.; Oil of Peppermint, 0.05 Gm.; Oil of Gaultheria, 0.025 Gm.; Oil of Thyme, 0.01 Gm.; Alcohol, 25 Gm.; and Water to make 100 Cc.

This solution is more of a toilet article than a medicine, and should not have been made official. The name antiseptic solution is misleading.

Dose.—2 to 4 Cc.; ½ to 1 f℥.

Liquor Arseni et Hydrargyri Iodidi (*Solution of Arsenous and Mercuric Iodides*). *Synonym*, Donovan's Solution.—A clear, colorless, or pale yellowish liquid, without odor, and having a disagreeable metallic taste, made by dissolving 1 Gm. of Arsenous Iodide, and 1 Gm. of Mercuric Iodide in Distilled Water, a sufficient quantity to make 100 Cc.

Dose.—0.06 to 0.2 Cc.; 1 to 3 minims.

Liquor Calcis (*Lime Water, Solution of Calcium Hydroxide*).—A clear, colorless liquid, without odor, and having an alkaline taste, containing not less than 0.14 per cent. of pure calcium hydroxide ($Ca(OH)_2$). It is a saturated solution of calcium hydroxide, the percentage of the hydroxide varying with the temperature at which the solution is prepared, being about 0.17 per cent. at 15° C. (59° F.), the percentage diminishing as the temperature rises. Lime water is made by slaking 12 Gm. of Lime, by very gradually adding 400 Cc. of Distilled Water, and agitating occasionally during half an hour. After the suspended particles have subsided, the supernatant liquid is decanted and thrown away; to the residue 3600 Cc. of distilled water are added, agitated thoroughly, and after twenty-four hours the clear liquid is decanted and poured into glass-stoppered bottles.

Upon exposure to the air, lime water absorbs carbon dioxide, changing a part of the calcium hydrate to calcium carbonate, which forms a pellicle on the surface of the liquid.

Dose.—4 to 30 Cc.; 1 to 8 f℥.

Liquor Chlori Compositus (*Compound Chlorine Solution, Chlorine Water*).—A clear, almost colorless solution having the odor of chlorine and a sharp, acrid taste, containing, when freshly prepared, about 0.4 per cent. of chlorine, with some oxides of chlorine and potassium chloride. It is made by adding Hydrochloric Acid, diluted with about an equal volume of Water, to Potassium Chlorate (dry), contained in a capacious flask; placing the flask on a water-bath containing boiling water for about three minutes, and when the flask fills with greenish yellowish chlorine gas removing it from the water-bath, and adding Water in several portions, shaking well after each. Mostly *used* as a disinfectant.

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

Liquor Cresolis Compositus (*Compound Solution of Cresol*).—Made by dissolving 8 Gm. of Potassium Hydroxide in 50 Gm. of Water, in a tared dish, adding 35 Gm. of Linseed Oil and mixing thoroughly; then adding 50 Gm. of Cresol and stirring until a clear solution is produced, and finally adding a sufficient quantity of Water to make 100 Cc. The solution is freely miscible with water, forming an opaque, cloudy, soapy solution. It is *used* as an antiseptic.

Liquor Ferri Chloridi (*Solution of Ferric Chloride*).—A heavy, reddish-brown liquid, having a faint odor of hydrochloric acid, an acid, strongly styptic taste, and acid reaction, and containing not less than 29 per cent. of anhydrous ferric chloride. It is made by acting on

iron, in the form of bright wire, with a solution of hydrochloric acid and water to form ferrous chloride, which is then oxidized to ferric chloride by nitric acid. *Used* in making Tincture of Ferric Chloride.

Dose.—0.3 to 0.6 Cc.; 5 to 10 minims.

Liquor Ferri et Ammonii Acetatis (*Solution of Iron and Ammonium Acetate*). *Synonym,* Basham's Mixture.—A clear, reddish-brown liquid having an agreeable, acetous, aromatic odor, and a mildly styptic, acidulous, sweet taste. It is made by adding to 50 Cc. of Solution of Ammonium Acetate, in the following order: 6 Cc. of Diluted Acetic Acid; 4 Cc. of Tincture of Ferric Chloride; 12 Cc. of Aromatic Elixir; 12 Cc. of Glycerin, and lastly water, a sufficient quantity to make 100 Cc. The solution should be freshly prepared when wanted.

Dose.—8 to 30 Cc.; 2 to 8 f℥.

Liquor Ferri Subsulphatis (*Solution of Ferric Subsulphate*). *Synonym,* Monsel's Solution.—A heavy, dark, reddish-brown liquid, nearly odorless; an acid, strongly styptic taste; and an acid reaction; made by heating Ferrous Sulphate in a solution of Sulphuric and Nitric acids. The solution is of variable chemical composition, containing an amount of basic ferric sulphate, corresponding to not less than 13.57 per cent. of metallic iron.

At one time popular as a styptic, this preparation has, by reason of its irritating properties, deservedly fallen into disuse. If taken internally, it should be well diluted with water.

Dose.—0.3 to 0.3 Cc.; 5 to 10 minims.

Liquor Ferri Tersulphatis (*Solution of Ferric Sulphate*).—A heavy, dark, reddish-brown liquid, almost odorless, having an acid, strongly styptic taste, and an acid reaction, containing about 36 per cent. of ferric sulphate, corresponding to not less than 10 per cent. of metallic iron. It is made by heating Ferrous Sulphate in a solution of Sulphuric Acid, being largely in excess. *Used* in making arsenic antidote. Has deservedly fallen into disuse as a styptic.

Liquor Formaldehydi (*Solution of Formaldeyhde*).—An aqueous solution containing not less than 37 per cent., by weight, of absolute Formaldehyde (H.COH), an oxidation product of methyl alcohol. The liquid is clear, colorless, has a pungent odor, a caustic taste, and gives off vapor which is irritating to the mucous membranes. Upon standing, the solution sometimes separates paraformaldehyde, becoming cloudy. It is usually made by passing the vapor of Methyl Alcohol, mixed with the proper quantity of air, over heated copper tubes, condensing the vapor in cooled copper tanks, and adding water. *Used* as a disinfectant.

Liquor Hydrargyri Nitratis (*Solution of Mercuric Nitrate*).—A powerful, corrosive liquid, containing about 60 per cent. of *mercuric nitrate* and 11 per cent. of *nitric acid.* It is clear, colorless, and heavy, having the faint odor of nitric acid, and a strongly acid reaction. It

is made by dissolving 40 Gm. of Red Mercuric Oxide in a mixture of 45 Gm. of Nitric Acid and 15 Gm. of Water. *Used* as an escharotic.

Liquor Iodi Compositus (*Compound Solution of Iodine*). *Synonym*, Lugol's Solution.—A deep violet-colored liquid, having the characteristic odor and taste of iodine. It is made by dissolving 5 Gm. of Iodine and 10 Gm. of Potassium Iodide in a sufficient quantity of Water to make 100 Cc. *Used* locally and internally.

Dose.—0.3 to 0.6 Cc.; 5 to 10 minims.

Liquor Magnesii Citratis (*Solution of Magnesium Citrate*).—A clear, or slightly cloudy, effervescent liquid having a sweet, acidulous taste. It is made by dissolving 15 Gm. of Magnesium Carbonate in an aqueous solution of 33 Gm. of Citric Acid, filtering, placing in a strong bottle of the capacity of 360 Cc.; adding 60 Cc. of Syrup of Citric Acid, then enough Water to nearly fill the bottle, and lastly 2.5 Gm. of Potassium Bicarbonate and stoppering the bottle to prevent the escape of carbon dioxide.

Dose.—180 to 360 Cc.; 6 to 12 f℥.

Liquor Plumbi Subacetatis (*Solution of Lead Subacetate*). *Synonym*, Goulard's Extract.—A clear, colorless, aqueous liquid, containing in solution not less than 25 per cent. of lead subacetate. It is odorless, has a sweetish, astringent taste, an alkaline reaction, absorbs carbon dioxide, and forms a white precipitate upon exposure to the air. When applied locally, it whitens and constringes the tissues. Solution of lead subacetate is made by boiling 18 Gm. of Lead Acetate and 11 Gm. of Lead Oxide in 70 Cc. of Distilled Water, cooling, filtering, and adding enough cooled, Boiled Water to make 100 Gm. In diluted form, *used* locally upon unbroken tissues, and as a sedative astringent to relieve *acute inflammation*.

Liquor Plumbi Subacetatis Dilutus (*Diluted Solution of Lead Subacetate*). *Synonym*, Lead Water.—An aqueous solution containing 1 per cent. of lead subacetate, made by adding 4 Gm. of Solution of Lead Subacetate to 96 Gm. of Distilled Water.

Used locally as sedative astringent, but too weak to be generally valuable.

Liquor Potassii Arsenitis (*Solution of Potassium Arsenite*). *Synonym*, Fowler's Solution.—An aqueous solution of potassium arsenite corresponding in amount to 1 per cent. of arsenic trioxide. It is made by boiling 1 Gm. of Arsenic Trioxide and 2 Gm. of Potassium Bicarbonate in a tared dish with 10 Gm. of Distilled Water until dissolved, adding enough Distilled Water to make 97 Gm., and then 3 Gm. of Compound Tincture of Lavender, and lastly filtering.

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

Liquor Potassii Citratis (*Solution of Potassium Citrate*).—An aqueous liquid, containing in solution not less than 8 per cent. of anhydrous Potassium Citrate, with small amounts of citric and carbonic acids. When wanted, it should be freshly prepared by dissolving 8 Gm. of

Potassium Bicarbonate and 6 Gm. of Citric Acid each separately in 40 Cc. of distilled water, filtering each separately, and adding enough Distilled Water to each solution to make 50 Cc., mixing the two solutions, and when effervescence has ceased transferring the liquid to a bottle.

Dose.—4 to 30 Cc.; 1 to 8 f℥.

Liquor Potassii Hydroxidi (*Solution of Potassium Hydroxide*). *Synonym*, Liquor Potassæ.—A clear, colorless, odorless, strongly alkaline, acrid, and caustic liquid containing about 5 per cent. of absolute potassium hydroxide. It is made by dissolving 6 Gm. of Potassium Hydroxide in 94 Gm. of Distilled Water. The solution should be kept in green glass bottles provided with glass stoppers coated with paraffin or petrolatum.

Dose.—0.3 to 1 Cc.; 5 to 15 minims.

Liquor Sodæ Chlorinatæ (*Solution of Chlorinated Soda*). *Synonym*, Labarraque's Solution.—A clear, pale greenish aqueous solution of several chlorine compounds of sodium, containing at least 2.4 per cent., by weight, of available chlorine. The solution is made by decomposing a solution of Chlorinated Lime, with Monohydrated Sodium Carbonate. *Used* mostly as a disinfectant.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

Liquor Sodæ Arsenatis (*Solution of Sodium Arsenate*) *Synonym*, Pearson's Solution.—A clear, colorless aqueous liquid, made by dissolving 1 Gm. of Exsiccated Sodium Arsenate in water enough to make 100 Gm.

Dose.—0.06 to 0.3 Cc.; 1 to 5 minims.

Liquor Sodii Hydroxidi (*Solution of Sodium Hydroxide*). *Synonym*, Liquor Sodæ.—A clear, colorless, odorless, strongly alkaline, acrid, and caustic solution containing about 5 per cent. of absolute sodium hydroxide. It is made by dissolving 5.6 Gm. of Sodium Hydroxide in 94.4 Gm. of Distilled Water. The solution should be kept in green glass bottles provided with glass stoppers coated with paraffin or petrolatum.

Dose.—0.3 to 1 Cc.; 5 to 15 minims.

Liquor Sodii Phosphatis Compositus (*Compound Solution of Sodium Phosphate*).—A clear, colorless liquid having an acidulous, saline, and slightly bitter taste, made by dissolving 100 Gm. of Sodium Phosphate, with 4 Gm. of Sodium Nitrate and 13 Gm. of Citric Acid, in enough Distilled Water to make 100 Cc.

Dose.—8 to 16 Cc.; 2 to 4 f℥.

Liquor Zinci Chloridi (*Solution of Zinc Chloride*).—A clear, colorless, odorless, very astringent, aqueous liquid, having a metallic taste, and an acid reaction, containing about 50 per cent., by weight, of absolute zinc chloride. It is made by acting upon Zinc with Hydrochloric Acid, treating the solution thus obtained with Nitric Acid, evaporating until upon cooling it solidifies, dissolving the salt in Water, adding Zinc Carbonate, and after twenty-four hours separating the clear supernatant liquid from the sediment by decanting or by means of a syphon

Used as a disinfectant.

MASSÆ—Masses

The official masses are soft, solid preparations of such consistency that they may be readily made into pills without the addition of an excipient. They are usually prepared by incorporating the medicinal substance with clarified honey, sugar, and syrup. Only two are official:

Massa Ferri Carbonatis (*Mass of Ferrous Carbonate*). *Synonym*, Vallet's Mass.—A greenish-gray mass of pilular consistency, made by incorporating freshly precipitated ferrous carbonate with clarified honey and sugar. It is prepared by dissolving 100 Gm. of Ferrous Carbonate and 46 Gm. of Monohydrated Sodium Carbonate, each separately in 200 Cc. of Boiling Distilled Water, and, having added 25 Cc. of Syrup to the solution of the ferrous salt, both solutions are filtered and allowed to become cooled. The solution of monohydrated sodium carbonate is introduced into a bottle having the capacity of about 500 Cc., and the solution of ferrous sulphate is gradually added to it, the bottle being rotated constantly or frequently, until carbon dioxide no longer escapes. A sufficient quantity of distilled water is added to the bottle, which is then corked and set aside, so that the newly formed ferrous carbonate may subside. The supernatant liquid is poured off, and the precipitate is washed with a solution of one volume of syrup, and ten volumes of distilled water, and decanted until the washings no longer have a saline taste. The precipitate is drained on a muslin strainer, and expressed so as to free it, as much as possible, from an excess of water. Lastly, the precipitate is mixed at once with 38 Gm. of Clarified Honey, and 25 Gm. of Granulated Sugar, and, by means of a water-bath, evaporating the mixture is a tared dish, with constant stirring until it is reduced to 100 Gm.

Dose.—0.2 to 0.6 Gm.; 3 to 10 grains.

Massa Hydrargyri (*Mass of Mercury*). *Synonym*, Blue Mass.—A dark, greenish mass containing 33 per cent., by weight, of metallic mercury in a state of fine subdivision combined with glycyrrhiza, althea, glycerin, and honey of rose. Made by triturating 33 Gm. of Mercury with 33 Gm. of Honey of Rose until it is extinguished, and globules of mercury are no longer visible under a lens of at least ten diameters; adding 9 Gm. of Glycerin, then 10 Gm. of powdered Glycyrrhiza and 15 Gm. of powdered Althea, gradually, continuing the trituration until the mass is homogeneous. The mass should contain but a very small percentage of mercurous oxide, which is developed from the metallic mercury during the process of preparing. Upon long standing, and when improperly made from substances not strictly pure, the mass contains an excessive quantity of mercurous oxide, and some mercuric oxide; when in this state it is unfit for use.

Dose.—0.1 to 1.3 Gm.; 2 to 20 grains.

MELLITA—Honeys

Honeys are liquid preparations made by incorporating substances with clarified honey.

The following are official:

Mel (*Honey*).—A syrupy liquid of a light yellow, or yellowish-brown color, consisting of a saccharine secretion deposited in the honeycomb by bees.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Mel Depuratum (*Clarified Honey*).—A clear, syrupy liquid made by mixing honey with 2 per cent. of its weight of clean paper pulp reduced to shreds, strongly expressing, and again shredding. Then applying the heat of the water-bath, and as long as any scum rises to the surface, carefully removing it. Finally adding enough distilled water to make up loss incurred by evaporation, straining, and mixing the strained liquid with 5 per cent. of its quantity of glycerin.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Mel Rosæ (*Honey of Rose*).—Made by thoroughly mixing together 12 Cc. of Fluidextract of Rose with enough Clarified Honey to make 100 Cc.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

MISTURÆ—Mixtures

Mixtures are aqueous liquids containing insoluble or only partly soluble medicinal substances. It is this class of preparations to which a greater number of our extemporaneous liquid prescriptions belong. In preparing extemporaneous mixtures, it is usual to add a small quantity of powdered gum or mucilage, so as to increase the specific gravity of the liquid, so as to delay the rapid sedimentation of the insoluble substance. Mixtures are not to be filtered or strained, but dispensed with a shake label.

Mistura Cretæ (*Chalk Mixture*).

Ingredients.—Compound Chalk Powder, 20 Gm.; Cinnamon Water, 40 Cc.; Water, a sufficient quantity to make 100 Cc.

Dose.—4 to 16 Cc.; 1 to 4 f℥.

Mistura Ferri Composita (*Compound Iron Mixture*). *Synonym,* Griffith's Mixture.

Ingredients.—Ferrous Sulphate, 0.6 Gm.; Myrrh, 1.8 Gm.; Sugar, 1.8 Gm.; Potassium Carbonate, 0.8 Gm.; Spirit of Lavender, 6 Cc.; Rose Water, a sufficient quantity to make 100 Cc.

Dose.—4 to 16 Cc.; 1 to 4 f℥.

Mistura Glycyrrhizæ Composita (*Compound Mixture of Glycyrrhiza*). *Synonym,* Brown Mixture.

Ingredients.—Pure Extract of Glycyrrhiza, 3 Gm.; Syrup, 5 Gm.; Acacia, 3 Gm.; Camphorated Tincture of Opium, 12 Cc.; Wine of Antimony, 6 Cc.; Spirit of Nitrous Ether, 3 Cc.; Water, a sufficient quantity to make 100 Cc.

Dose.—4 to 16 Cc.; 1 to 4 f℥.

Mistura Rhei et Sodæ (*Mixture of Rhubarb and Soda*).

Ingredients.—Sodium Bicarbonate, 3.5 Gm.; Fluidextract of Rhubarb, 1.5 Cc.; Fluidextract of Ipecac, 0.3 Cc.; Glycerin, 35 Cc.; Spirit of Peppermint, 3.5 Cc.; Water, a sufficient quantity, to make 100 Cc.

Dose.—2 to 8 Cc.; ½ to 2 f℥.

MUCILAGINES—Mucilages

Mucilages are aqueous solutions of the mucilaginous principles of vegetable substances. In pharmacy, they are used in preparing emulsions, mixtures, and as excipients for forming pill and troche masses. They are sometimes administered to soothe inflamed mucous membranes. The mucilage of sassafras pith is used in eye washes. The mucilages do not keep well during warm weather, and are precipitated by alcoholic liquids.

The following are official:

Mucilago Acaciæ (*Mucilage of Acacia*).—Made by washing 34 Gm of Acacia in small fragments with Cold Water, and after allowing it to drain, adding to it 33 Gm. of Lime Water, and then enough water to make 100 Gm., and agitating and stirring it occasionally until the acacia is dissolved, and finally straining. Unless kept in well-stoppered bottles, completely filled, and in a cool place, the mucilage soon sours.

Dose.—4 to 16 Cc.; 1 to 4 f℥, or more.

Mucilago Sassafras Medullæ (*Mucilage of Sassafras Pith*).—Made by macerating 2 Gm. of Sassafras Pith in Water during three hours, and straining without expressing. It should be freshly made when wanted.

Dose.—4 to 16 Cc.; 1 to 4 f℥, or more.

Mucilago Tragacanthæ (*Mucilage of Tragacanth*).—Made by adding 6 Gm. of Tragacanth to a hot solution composed of Glycerin, 18 Gm., and Water, 75 Cc., macerating during twenty-four hours, and stirring occasionally, and then adding enough Water to make the mixture weigh 100 Gm., beating it until it has a uniform consistency, and straining it forcibly through muslin.

Dose.—4 to 16 Cc.; 1 to 4 f℥, or more.

Mucilago Ulmi (*Mucilage of Elm*).—Made by digesting 6 Gm. of Elm with 100 Cc. of Water on a water-bath in a covered vessel during one hour, and then straining. It should be freshly prepared when wanted.

Dose.—4 to 16 Cc.; 1 to 4 f℥, or more.

OLEATA—Oleates

Oleates are soft, semisolid, salve-like preparations consisting of a solution of metallic oxides or vegetable alkaloids in oleic acid. They are intended to be applied locally with the object of obtaining either a local or systemic effect through absorption of the medicinal agent, dissolved in oleic acid, by the skin. Absorption of medicaments from the skin takes place more readily from oleates than from ointments. The oleates of veratrine and of atropine should be applied in small quantities only, as poisoning by them is liable to result from their too frequent, or liberal use.

The following oleates are official:

Oleatum Atropinæ (*Oleate of Atropine*).—Made by triturating 2 Gm. of Atropine in a tared mortar with 2 Cc. of Alcohol, then adding an equal quantity of Oleic acid, and, after warming the mortar, stirring until the alcohol is evaporated, adding 48 Cc. of Oleic acid, and continuing to stir the mixture until the atropine has dissolved; then adding a sufficient quantity of Olive Oil to make 100 Gm. of the oleate. Each grain of the oleate contains about $\frac{1}{50}$ grain of atropine, so that it is not safe to apply more than one or two grains of the oleate at a single application.

Oleatum Cocainæ (*Oleate of Cocaine*).—Made by triturating 5 Gm. of Cocaine (free alkaloid) with 5 Cc. of Alcohol, then adding about an equal volume of Oleic acid, and, after warming the mortar, stirring until the alcohol has evaporated, and adding 45 Cc. of Oleic acid, continuing the stirring until the cocaine has dissolved, then adding a sufficient quantity of Olive Oil to make 100 Gm. of the oleate.

Oleatum Hydrargyri (*Oleate of Mercury*).—Made by triturating 25 Gm. of Yellow Mercuric Oxide with 25 Cc. of Distilled Water in a tared mortar; adding 70 Gm. of Oleic Acid and mixing thoroughly; warming the mortar to a temperature not exceeding 50° C. (122° F.), stirring occasionally until the water has evaporated, then adding, if necessary, a sufficient quantity of Oleic Acid to make 100 Gm. of the oleate. Contact of the oleate with metallic utensils should be avoided.

Oleatum Quininæ (*Oleate of Quinine*).—Made by triturating 25 Gm. of Quinine in a warm mortar with 10 Gm. of Oleic Acid to form a smooth paste; then adding 65 Gm. of warmed Oleic Acid, stirring frequently until the quinine is dissolved.

Oleatum Veratrinæ (*Oleate of Veratrine*).—Made by triturating 2 Gm. of Veratrine in a tared mortar with about 5 Cc. of Olive Oil, and, after warming the mortar, adding 50 Gm. of Oleic Acid, and continuing the stirring until the veratrine has dissolved; then adding a sufficient quantity of Olive Oil to make 100 Gm. of the oleate.

Each grain of the oleate contains about $\frac{1}{50}$ grain of veratrine, so that it is not safe to apply more than 3 to 5 grains of the oleate at a single application.

OLEORESINÆ—Oleoresins

Oleoresins are concentrated liquid preparations consisting of oils and resins obtained by percolating drugs rich in oils and resins with acetone, and then evaporating. They are all energetic medicinal agents, and are conveniently prescribed in emulsions, pills, or soft capsules. The following are official:

Oleoresina Aspidii (*Oleoresin of Aspidium*). *Synonym*, Oleoresin of Male Fern.—Upon standing, it deposits a granular, crystalline substance, which is therapeutically valuable, therefore the contents of the vessel containing the oleoresin should be thoroughly shaken before being used.

Dose.—2 to 4 Cc.; ½ to 1 f℥.

Oleoresina Capsici (*Oleoresin of Capsicum*).

Dose.—0.015 to 0.06 Cc.; ¼ to 1 minim.

Oleoresina Cubebæ (*Oleoresin of Cubeb*).—After standing for some time, the oleoresin deposits waxy and crystalline matter, which should be rejected, the liquid portion only being useful.

Dose.—0.3 to 1.2 Cc.; 5 to 20 minims.

Oleoresina Lupulini (*Oleoresin of Lupulin*).

Dose.—0.12 to 0.3 Cc.; 2 to 5 minims.

Oleoresina Piperis (*Oleoresin of Pepper*).

Dose.—0.015 to 0.06 Cc.; ¼ to 1 minim.

Oleoresina Zingiberis (*Oleoresin of Ginger*).

Dose.—0.03 to 0.06 Cc.; ½ to 1 minim.

PILULÆ—Pills

Pills are round, ovoidal, flattened solids, of such size and consistency that they may be swallowed whole. The quantity of medicine entered into a pill may be from about 1 to 5 grains; a greater quantity than this will make the pill too large. Small, sugar-coated pills of less than one grain are known as granules. Hygroscopic, deliquescent, volatile, and readily oxidizable substances, and liquids are not, as a rule, suitable for making into pills, but, under some circumstances, if the quantities are small, they may be made into pills which should be immediately coated.

Coatings for pills are employed to improve their appearance, to prevent volatilization, deliquescence, efflorescence, and oxidization. The most usual and generally preferred coating is gelatin, although they are frequently coated with sugar, chalk, tolu, salol, or keratin. If the remedy of which pills are made is expected to become absorbed from the stomach, the pills should be freshly made, but if they are intended to be dissolved and act in the intestinal tract, they should be coated

with some substance which is not soluble in the gastric juices. Both keratin and salol are used as coatings when the pills are intended for disintegration and absorption in the intestines alone.

Pills are usually made by thoroughly triturating together the medicinal substances, if necessary adding an inert extract, gum, or soap as a diluent or excipient, gradually adding, a few drops at a time, a sufficient quantity of water, glycerin, syrup, or syrup of acacia to develop the adhesive properties of the ingredients, so as to form a mass of suitable consistency, rolling into a cylinder, dividing into equal particles, and rolling into globules. In some instances, it is necessary to add an inert dry powder to soft extracts or semiliquid substances so as to be able to form the mass, before dividing into pills.

The following pills are official:

Pilulæ Aloes (*Pills of Aloes*).—Each pill contains Purified Aloes, about 2 grains (0.13 Gm.); Soap, about 2 grains (0.13 Gm.); Water, a sufficient quantity.

Dose.—2 pills.

Pilulæ Aloes et Ferri (*Pills of Aloes and Iron*).—Each pill contains Purified Aloes, about 1 grain (0.07 Gm.); Exsiccated Ferrous Sulphate, about 1 grain (0.07 Gm.); Aromatic Powder, about 1 grain (0.07 Gm.); Confection of Rose, a sufficient quantity.

Dose.—2 pills.

Pilulæ Aloes et Mastiches (*Pills of Aloes and Mastic*). *Synonym*, Lady Webster's Dinner Pills.—Each pill contains Purified Aloes, about 2 grains (0.13 Gm.); Mastic, about $\frac{2}{3}$ grain (0.04 Gm.); Red Rose, about $\frac{1}{2}$ grain (0.03 Gm.); Diluted Alcohol, a sufficient quantity.

Dose.—2 pills.

Pilulæ Aloes et Myrrhæ (*Pills of Aloes and Myrrh*).—Each pill contains Purified Aloes, about 2 grains (0.13 Gm.); Myrrh, about 1 grain (0.06 Gm.); Aromatic Powder, about $\frac{2}{3}$ grain (0.04 Gm.); Syrup, a sufficient quantity.

Dose.—2 pills.

Pilulæ Asafœtidæ (*Pills of Asafetida*).—Each pill contains Asafetida, about 3 grains (0.2 Gm.); Soap, about 1 grain (0.06 Gm.); Water, a sufficient quantity.

Dose.—2 pills.

Pilulæ Catharticæ Compositæ (*Compound Cathartic Pills*).—Each pill contains Compound Extract of Colocynth, about $1\frac{1}{3}$ grains (0.08 Gm.); Mild Mercurous Chloride, about 1 grain (0.06 Gm.); Resin of Jalap, about $\frac{1}{3}$ grain (0.02 Gm.); Gamboge, about $\frac{1}{4}$ grain (0.015 Gm.); Diluted Alcohol, a sufficient quantity.

Dose.—2 pills.

Pilulæ Catharticæ Vegetabiles (*Vegetable Cathartic Pills*).—Each pill contains Compound Extract of Colocynth, about 1 grain (0.06 Gm.); Extract of Hyoscyamus, about $\frac{1}{2}$ grain (0.03 Gm.); Resin of

Jalap, about $\frac{1}{3}$ grain (0.02 Gm.); Extract of Leptandra, about $\frac{1}{4}$ grain (0.015 Gm.); Resin of Podophyllum, about $\frac{1}{4}$ grain (0.015 Gm.); Oil of Peppermint, about $\frac{1}{8}$ minim (0.008 Cc.); Diluted Alcohol, a sufficient quantity.

Dose.—2 pills.

Pilulæ Ferri Carbonatis (*Pills of Ferrous Carbonate*). *Synonym,* Blaud's Pills.—Made by rubbing 8 Gm. of Potassium Carbonate in a mortar with about 10 drops each of Glycerin and Water; then adding 16 Gm. of Granulated Ferrous Sulphate, and 4 Gm. of Sugar previously triturated together to form a uniform powder, and rub the mass thoroughly until it assumes a greenish color (indicating that the ferrous sulphate has been fully changed into ferrous carbonate). When the reaction has terminated, 1 Gm. of Powdered Tragacanth and 1 Gm. of Powdered Althea are incorporated, and, if necessary, a few drops of water, so as to form a firm mass of pilular consistency. Divide this into 100 pills. Each pill is about 5 grains (0.3 Gm.) in weight, and contains when freshly made about 1 grain (0.06 Gm.) of ferrous carbonate. As the iron salt gradually oxidizes, the pills should be freshly prepared when wanted.

Dose.—2 pills.

Pilulæ Ferri Iodidi (*Pills of Ferrous Iodide*). *Synonym,* Blancard's Pills.—Made by adding 6 Cc. of Water to 4 Gm. of Reduced Iron contained in a small mortar, and then gradually 5 Gm. of Iodine, with constant stirring until the liquid ceases to have a reddish tint (showing that the iodine has entered fully into chemical combination). Then adding 4 Gm. of Powdered Glycyrrhiza, 4 Gm. of Powdered Sugar, 1 Gm. of Powdered Extract of Glycyrrhiza, and 1 Gm. of Powdered Acacia, previously triturated together, and mixing the whole thoroughly. The mass is then transferred to a porcelain dish, the excess of moisture evaporated on a water-bath, with constant stirring until the mass acquires a pilular consistence. It is then divided into 100 pills, which are then coated with Balsam of Tolu so as to prevent oxidation of the ferrous salt. To coat the pills with Balsam of Tolu, dissolve 10 Gm. of Balsam of Tolu in 15 Cc. of Ether, shake the pills with a sufficient quantity of this solution until they are uniformly coated, and put them in a plate to dry, occasionally rolling them about until drying is completed. The pills should be preserved in well-stoppered bottles, and should be devoid of the smell of free iodine. Each pill contains about 1 grain (0.06 Gm.) of ferrous iodide.

Dose.—2 pills.

Pilulæ Laxativæ Compositæ (*Compound Laxative Pills*).—Each pill contains Aloin, about $\frac{1}{5}$ grain (0.012 Gm.); Strychnine, about $\frac{1}{120}$ grain (0.0005 Gm.); Extract of Belladonna Leaves, about $\frac{1}{8}$ grain (0.008 Gm.); Ipecac, about $\frac{1}{16}$ grain (0.004 Gm.); Glycyrrhiza, about $\frac{3}{4}$ grain (0.046 Gm.); Syrup, a sufficient quantity.

Dose.—2 pills.

Pilulæ Opii (*Pills of Opium*).—Each pill contains Powdered Opium, about 1 grain (0.065 Gm.); Soap, about $\frac{1}{3}$ grain (0.02); Water, a sufficient quantity.

Dose.—1 pill.

Pilulæ Phosphori (*Pills of Phosphorus*).—Each pill contains about $\frac{1}{100}$ grain (0.0006 Gm.) of Phosphorus, and are coated with Balsam of Tolu. Made by dissolving 0.06 Gm. of Phosphorus in a test-tube in 5 Cc. of Chloroform with the aid of a gentle heat, replacing from time to time any of the chloroform which may be lost by evaporation. Powdered acacia, 3 Gm., and Powdered Althea, 6 Gm., are triturated together in a mortar, the solution of phosphorus is added to it and immediately followed by the addition of 4 Cc. of a mixture of two volumes of Glycerin and one volume of Water and quickly forming a mass, which is at once divided into 100 pills, and coating them with Balsam of Tolu. The pills are coated with balsam of tolu by dissolving 10 Gm. of balsam of tolu in 15 Cc. of ether, shaking the pill with a sufficient quantity of this solution until they are uniformly coated, and placing them on a plate to dry, occasionally rolling them about until drying is complete.

Dose.—1 pill.

Pilulæ Podophylli, Belladonnæ et Capsici (*Pills of Podophyllum, Belladonna, and Capsicum*).—Each pill contains Resin of Podophyllum, about $\frac{1}{4}$ grain (0.016 Gm.); Extract of Belladonna Leaves, about $\frac{1}{8}$ grain (0.008 Gm.); Capsicum, about $\frac{1}{2}$ grain (0.032); Sugar of Milk, about 1 grain (0.065 Gm.); Acacia, about $\frac{1}{4}$ grain (0.016 Gm.); Glycerin, Syrup, of each a sufficient quantity.

Dose.—1 pill.

Pilulæ Rhei Compositæ (*Compound Pills of Rhubarb*).—Each pill contains Rhubarb, about 2 grains (0.13 Gm.); Purified Aloes, about $1\frac{1}{2}$ grains (0.10 Gm.); Myrrh, about 1 grain (0.06 Gm.); Oil of Peppermint, about $\frac{1}{12}$ minim (0.005 Cc.); Water, a sufficient quantity.

Dose.—2 pills.

PULVERES—Powders.

The official powders are combinations of medicinal substances in a state of fine subdivision. With the exception of Seidlitz Powder, they are insoluble in water, but are conveniently prescribed in papers or packages, to be taken by stirring them in water at the time of administering. If desired, powders of which the doses are comparatively small may be administered in capsules; those of which the doses are large may be administered in cachets. Powders may be prepared extemporaneously from many non-irritating substances, which are free from a disagreeable taste and permanent in air, by triturating the powdered drug with sugar, sugar of milk, or any other acceptable inert powder, such extemporaneous powders constitute a large number of physicians' prescriptions.

The following powders are official:

Pulvis Acetanilidi Compositus (*Compound Acetanilide Powder*).—Made by pulverizing and thoroughly mixing, Acetanilide, 70 Gm.; Caffeine, 10 Gm.; and Sodium Bicarbonate, 20 Gm.; to make 100 Gm. of powder.

Dose.—0.3 to 0.6 Gm.; 5 to 10 grains.

Pulvis Aromaticus (*Aromatic Powder*).—Made by triturating 15 Gm. of Powdered Cardamom and 15 Gm. of Powdered Nutmeg with a portion of 35 Gm. of Powdered Saigon Cinnamon, until they are reduced to a fine powder; then adding the remainder of the Saigon Cinnamon and 35 Gm. of Powdered Ginger, and rubbing them together until they are thoroughly mixed.

Dose.—0.6 to 2 Gm.; 20 to 30 grains.

Pulvis Cretæ Compositus (*Compound Chalk Powder*).—Made by thoroughly mixing 30 Gm. of Prepared Chalk, 20 Gm. of Powdered Acacia, and 50 Gm. of Sugar, to make 100 Gm. of the powder.

Dose.—0.6 to 2 Gm.; 10 to 30 grains.

Pulvis Effervescens Compositus (*Compound Effervescing Powder*). *Synonym,* Seidlitz Powders.—Made by drying, powdering, and mixing 31 Gm. of Sodium Bicarbonate and 93 Gm. of Potassium and Sodium Tartrate, and dividing the mixture into twelve equal parts, and wrapping each in a separate *blue* paper. Drying and pulverizing 27 Gm. of Tartaric Acid, dividing it into twelve equal parts, and wrapping each separately in *white* paper. When ready to administer dissolve the contents of a blue paper, and the contents of a white paper in water, separately, mix the liquids and administer before effervescence has entirely ceased.

Dose.—1 set of powders.

Pulvis Glycyrrhizæ Compositus (*Compound Powder of Glycyrrhiza*). *Synonym,* Compound Licorice Powder.—Made by mixing thoroughly 0.4 Gm. of Oil of Fennel with 50 Gm. of Powdered Sugar, and these with 18 Gm. of Powdered Senna, 23.6 Gm. of Powdered Glycyrrhiza, 8 Gm. of Washed Sulphur, passing the powder through a fine sieve, pulverizing the residue, if any, and adding to the sifted powder, and mixing the whole thoroughly.

Dose.—2 to 8 Gm.; 30 to 120 grains.

Pulvis Ipecacuanhæ et Opii (*Powder of Ipecac and Opium*). *Synonym,* Dover's Powder.—Made by thoroughly triturating together and reducing to a fine powder 10 Gm. of Powdered Ipecac and 10 Gm. of Powdered Opium with 80 Gm. of Sugar of Milk, to make 100 Gm. of the powder.

Dose.—0.3 to 1.3 Gm.; 5 to 20 grains.

Pulvis Jalapæ Compositus (*Compound Jalap Powder*).—Made by pulverizing, rubbing together, and thoroughly mixing 35 Gm. of Jalap and 65 Gm. of Potassium Bitartrate to make 100 Gm. of the powder.

Dose.—1 to 2.6 Gm.; 15 to 40 grains.

Pulvis Morphinæ Compositus (*Compound Powder of Morphine*). *Synonym,* Tully's Powder.—Made by rubbing 1.5 Gm. of Morphine Sulphate with 33.5 Gm. of Precipitated Calcium Carbonate, gradually added, then with 32 Gm. of Camphor previously reduced to powder by trituration in a mortar with Alcohol, and lastly with 33 Gm. of powdered Glycyrrhiza, to make 100 Gm. The powder should then be sifted, pulverizing any residue left in the sieve and adding to the sifted powder, thoroughly mixing, and transferring to well-stoppered bottles. Each grain of compound powder of morphine should contain about $\frac{1}{60}$ grain of morphine sulphate.

Dose.—0.3 to 0.6 Gm.; 5 to 10 grains.

Pulvis Rhei Compositus (*Compound Powder of Rhubarb*).—Made by rubbing 25 Gm. of powdered Rhubarb with 10 Gm. of powdered Ginger, and then with 65 Gm. of Magnesium Oxide, to make 100 Gm. of the powder.

Dose.—2 to 4 Gm.; 30 to 60 grains.

RESINÆ—Resins

Resins are a class of solid preparations usually obtained as a residue by distilling off the volatile oil from natural oleoresins, or by percolating resin-bearing drugs with alcohol, concentrating the percolate by distilling off the alcohol, adding the concentrated liquid to water, with constant stirring, collecting the resinous precipitate, washing it with water, and drying it by exposure to air or by the use of a gentle heat. The official resins are insoluble in water, but are soluble in alcohol, and partially soluble in ether, chloroform, and alkaline solutions. Ordinarily, they are best prescribed in pills, capsules, powders, or in alcoholic solution.

The following resins are official:

Resina (*Rosin*).—A residue left after distilling off the oil from turpentine.

Dose.—0.06 to 0.3 Gm.; 1 to 5 grains.

Resina Jalapæ (*Resin of Jalap*).—Made by exhausting Jalap by percolating it with Alcohol; concentrating the percolate by distilling off a part of its alcohol, then adding the concentrated liquid to water. When the precipitate has subsided, the clear supernatant liquid is decanted, and the precipitate washed twice, by decantation, with a fresh portion of hot water. After having drained off the liquid, the resin is transferred to a porcelain dish and heated to dryness on a water-bath.

Dose.—0.12 to 0.24 Gm.; 2 to 4 grains.

Resina Podophylli (*Resin of Podophyllum*).—Made by exhausting Podophyllum by percolating it with Alcohol; concentrating the percolate to a thin, syrupy liquid by distillation. The concentrated liquid is then poured in a thin stream, with constant stirring, into water cooled to a temperature below 10° C. (50° F.), and mixed with 1 per cent. of

Hydrochloric Acid. When the precipitate has subsided the supernatant liquid is decanted, the precipitate washed twice by decantation with fresh portions of cold water, drained, and spread in a thin layer upon a strainer to dry by exposure to air in a cool place protected from light. Should the resin coalesce, or form into lumps, having a varnish-like surface, it should be rubbed in a dry mortar to a powder.

Dose.—0.003 to 0.03 Gm.; $\frac{1}{20}$ to $\frac{1}{2}$ grain.

Resina Scammonii (*Resin of Scammony*).—Made by digesting Scammony with successive portions of Alcohol until it is exhausted, mixing the liquids, filtering, and concentrating it to a syrupy consistency by distilling off the alcohol. The concentrated liquid is added in a thin stream with active stirring, to water; the precipitate is collected, washed with water, and dried at a gentle heat.

Dose.—0.12 to 0.5 Gm.; 2 to 8 grains.

SPIRITUS—Spirits

The official spirits are alcoholic or hydroalcoholic solutions of volatile substances. They are mostly solutions of essential oils, some solutions of volatile liquids, some solutions of volatile solids, while still others are solutions of gases. Most of the spirits are made by dissolving the volatile substances in alcohol or in alcohol and water by simple agitation and maceration; some by passing gas into alcohol, others by distillation, and one, the spirit of nitrous ether, by chemical reaction. When added freely to water, spirits containing volatile oils form cloudy or milky mixtures, by reason of the separation of the volatile oils.

Spirit of ether, compound spirit of ether, aromatic spirit of ammonia, spirit of bitter almond, spirit of chloroform, spirit of glyceryl nitrate, spirit of juniper, compound spirit of juniper, spirit of ammonia, spirit of nitrous ether, whisky, and brandy possess distinct medicinal properties, while all the other official spirits are mildly carminative, and, in small quantities, are added to extemporaneous mixtures to impart to them an agreeable odor and taste.

The following spirits are official:

Spiritus Ætheris (*Spirit of Ether*).—Made by dissolving 32.5 Cc. of Ether in 67.5 Cc. of Alcohol to make 100 Cc. of the mixture.

Dose.—4 to 12 Cc.; 1 to 3 f℥.

Spiritus Ætheris Compositus (*Compound Spirit of Ether*). *Synonym*, Hoffman's Anodyne.—Made by mixing 32.5 Cc. of Ether, 65 Cc. of Alcohol, and 2.5 Cc. of Ethereal Oil, to make 100 Cc. of the spirit.

Dose.—2 to 4 Cc.; $\frac{1}{2}$ to 1 f℥.

Spiritus Ætheris Nitrosi (*Spirit of Nitrous Ether*). *Synonym*, Sweet Spirit of Nitre.—An alcoholic solution of ethyl nitrite, containing when freshly prepared not less than 4 per cent. of Ethyl Nitrite. It is made by dissolving freshly prepared ethyl nitrite in alcohol. The

pharmacopœia gives a process by which ethyl nitrite may be prepared by slowly adding an aqueous solution of sodium nitrite to a hydro-alcoholic solution of sulphuric acid, and freeing it from acidity by washing with a cold, aqueous solution of monohydrated sodium carbonate.

Spirit of nitrous ether is a clear, mobile, volatile, and inflammable liquid, of a pale yellowish, or faintly greenish-yellow tint, having a fragrant, ethereal and pungent odor, free from acidity, and a sharp, burning taste. When freshly prepared (only after being kept for a short time with but little exposure to light or air), it is neutral to litmus paper; when long kept and freely exposed to light and air, it acquires an acid reaction, when it is no longer fit for medicinal use.

Dose.—0.6 to 4 Cc.; 10 minims to 1 f℥.

Spiritus Ammoniæ (*Spirit of Ammonia*).—An alcoholic solution containing 10 per cent., by weight, of gaseous ammonia. It is a colorless liquid, having a strong odor of ammonia, and a sharp, acrid caustic taste. It is made by passing Ammonia Gas into Alcohol.

Dose.—0.6 to 4 Cc.; 10 to 60 minims.

Spiritus Ammoniæ Aromaticus (*Aromatic Spirit of Ammonia*).—Aromatic spirit of ammonia when freshly prepared is a nearly colorless liquid, but after a time gradually acquiring a darker tint. It has the pungent odor and taste of ammonia. The spirit is made by adding 3.4 Gm. of Ammonium Carbonate to 9 Cc. of Ammonia Water, and 14 Cc. of Distilled Water contained in a flask, closing the flask, and shaking the contents until the ammonium carbonate is dissolved, and allowing it to stand for twelve hours. Into a graduated bottle of suitable capacity, 70 Cc. of Alcohol is poured, and 1 Cc. of Oil of Lemon, 0.1 Cc. of Oil of Lavender Flowers, and 0.1 Cc. of Oil of Myristica are added, and thoroughly shaken together; to this alcoholic solution of the oils the aqueous solution of ammonium carbonate and ammonia water is added, and then enough water to make 100 Cc. The liquid is placed in a cool place for twenty-four hours, occasionally agitated, and finally filtered through paper in a well-covered funnel.

Dose.—0.6 to 4 Cc.; 10 minims to 1 f℥.

Spiritus Amygdalæ Amaræ (*Spirit of Bitter Almond*).—Made by dissolving 1 Cc. of Oil of Bitter Almond in 80 Cc. of Alcohol, and adding enough distilled water to make 100 Cc. of the spirit.

Dose.—0.2 to 0.6 Cc.; 3 to 10 minims.

Spiritus Anisi (*Spirit of Anise*).—Made by dissolving 10 Cc. of Oil of Anise in 90 Cc. of Alcohol, to make 100 Cc. of the spirit.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Spiritus Aurantii Compositus (*Compound Spirit of Orange*).—Made by mixing together 20 Cc. of Oil of Orange Peel, 5 Cc. of Oil of Lemon, 2 Cc. of Oil of Coriander, 0.5 Cc. of Oil of Anise, and a sufficient quantity of Alcohol to make 100 Cc. of the spirit. This spirit is used in making Aromatic Elixir.

Dose.—0.6 to 4 Cc.; 10 to 60 minims.

Spiritus Camphoræ (*Spirit of Camphor*).—Made by dissolving 10 Gm. of Camphor in 80 Cc. of Alcohol, filtering through paper, and passing enough Alcohol through the filter to make 100 Cc. of the spirit.

Dose.—0.3 to 2 Cc.; 5 to 30 minims.

Spiritus Chloroformi (*Spirit of Chloroform*).—Made by adding 6 Cc. of Chloroform and 94 Cc. of Alcohol to make 100 Cc. of the spirit.

Dose.—0.6 to 4 Cc.; 10 to 60 minims.

Spiritus Cinnamomi (*Spirit of Cinnamon*).—Made by mixing 10 Cc. of Oil of Cinnamon with 90 Cc. of alcohol to make 100 Cc. of the spirit.

Dose.—0.6 to 4 Cc.; 10 to 60 minims.

Spiritus Frumenti (*Whisky*).—An alcoholic liquid obtained by the distillation of mash of fermented grain, such as Indian corn, rye, wheat, and barley, or their mixtures. Whisky, suitable for medicinal use, should be amber-colored, have a distinct odor and taste, only a slightly acid reaction, should be at least four years old, having been permitted to mellow in wooden casks, and should contain from 37 to 47.5 per cent. by weight, or 44 to 55 per cent. by volume, of absolute alcohol.

Dose.—As required.

Spiritus Gaultheriæ (*Spirit of Gaultheria*). *Synonym,* Spirit of Wintergreen.—Made by dissolving 5 Cc. of Oil of Gaultheria in 95 Cc. of alcohol, to make 100 Cc. of the spirit.

Dose.—0.6 to 4 Cc.; 10 to 60 minims.

Spiritus Glycerylis Nitratis (*Spirit of Glyceryl Nitrate, Spirit of Nitroglycerin*). *Former Name,* Spiritus Glonoini.—An alcoholic solution containing 1 per cent., by weight, of Glyceryl Trinitrate, made by dissolving nitroglycerin in alcohol. It is a clear, colorless liquid, having the odor and taste of alcohol, and forming a cloudy mixture when added freely to water. Caution should be exercised in tasting and handling this liquid, since even a small quantity of it when tasted, or a large quantity when applied to the skin, is liable to produce a violent headache. Great care should be exercised in dispensing, handling, packing, transporting, and storing spirit of nitroglycerin, as a dangerous explosion may result if any considerable quantity of it be spilled, and the alcohol be partially or totally lost by evaporation. It should be transported in well-stoppered tin cans, and should be stored in a cool place, remote from fire. If, through accident, it should be spilled, a solution of potassium hydroxide should be poured at once over it to effect its decomposition.

Dose.—0.06 Cc.; 1 minim, and increased rapidly with caution until effects are manifested.

Spiritus Juniperi (*Spirit of Juniper*).—Made by mixing 5 Cc. of Oil of Juniper with 95 Cc. of Alcohol to make 100 Cc. of the spirit.

Dose.—0.6 to 4 Cc.; 10 to 60 minims.

Spiritus Juniperi Compositus (*Compound Spirit of Juniper*). *Synonym,* Gin.—Made by dissolving 8 Cc. of Oil of Juniper, 1 Cc. of

Oil of Caraway, 1 Cc. of Oil of Fennel, in 1400 Cc. of Alcohol, and gradually adding enough Water to make 2000 Cc. of the spirit.

Dose.—4 to 16 Cc.; 1 to 4 f℥.

Spiritus Lavandulæ (*Spirit of Lavender*).—Made by mixing 5 Cc. of Oil of Lavender Flowers with 95 Cc. of Alcohol, to make 100 Cc. of the spirit.

Dose.—2 to 4 Cc.; ½ to 1 f℥.

Spiritus Menthæ Piperitæ (*Spirit of Peppermint*).—Made by dissolving 10 Cc. of Oil of Peppermint in 90 Cc. of Alcohol, macerating for twenty-four hours with 1 Gm. of Bruised Peppermint, filtering through paper, and adding through the filter enough alcohol to make 100 Cc. of the spirit.

Dose.—0.6 to 1.2 Cc.; 10 to 20 minims.

Spiritus Menthæ Viridis (*Spirit of Spearmint*).—Made by dissolving 10 Cc. of Oil of Spearmint in 90 Cc. of Alcohol, macerating for twenty-four hours with 1 Cc. of bruised Spearmint, filtering through paper, and adding through the filter enough alcohol to make 100 Cc. of the spirit.

Dose.—1.2 to 2.5 Cc.; 20 to 40 minims.

Spiritus Vini Gallici (*Brandy*).—An alcoholic liquid obtained by the distillation of the fermented, unmodified juice of fresh grapes. Brandy is a pale amber-colored liquid, having a distinct odor and taste, a slightly acid reaction, should be at least four years old, having been mellowed in wooden casks, and should contain from 39 to 47 per cent. by weight, or 46 to 55 per cent. by volume, of absolute alcohol.

Dose.—Use as is required.

SUPPOSITORIA—Suppositories

Suppositories are conical, cylindrical, or globular bodies made by combining medicinal substances with oil of theobroma or glycerinated gelatin, and then moulding, rolling, or pressing it into bodies of suitable sizes and shapes. Ordinarily suppositories are intended to be introduced into the rectum, vagina, or urethra, as a means of obtaining either the local or the systemic effect of the medicating substance. Oil of theobroma, commonly known as cacao butter, by reason of being non-irritating, brittle, solid at temperature below 15° C. (59° F)., and melting at a temperature of from 30° to 35° C. (86° to 95° F.), has long been used for making suppositories. It melts more readily at the body temperature than does glycerinated gelatin, and is therefore more suited as a basis for rectal suppositories.

The following general formula has been introduced into the *United States Pharmacopœia* for making suppositories, having oil of theobroma as a basis:

"For suppositories made with Oil of Theobroma the following general process may be employed:

"Take of the Medicinal Substance, the prescribed quantity; Oil of Theobroma, grated, a sufficient quantity. Reduce the Medicinal Substance, if dry, to a very fine powder, or, if an extract, soften it with an appropriate liquid; then mix it thoroughly in a mortar with about an equal weight of grated Oil of Theobroma, and incorporate the remainder of the Oil of Theobroma until a homogeneous, plastic mass is obtained, adding if necessary a small quantity of Expressed Oil of Almond. Roll the mass on a graduated tile until a cylinder of the proper length is formed; divide this into the required number of equal parts, and with a spatula, or other convenient mechanical aid, form them into the desired shape.

"If the process of fusion is preferred, mix the Medicinal Substance with an equal weight of grated Oil of Theobroma, as above directed, then thoroughly incorporate it with the remainder of the Oil of Theobroma, previously melted by a gentle heat in a suitable vessel provided with a lip; then allow it to cool to about 38° C. (100.4° F.), and when the mixture begins to congeal, pour it immediately into suitable well-cooled moulds. Keep the moulds at a freezing temperature until the suppositories have hardened and are ready to be removed.

"For suppositories containing chloral, phenol, their derivatives, or substances which soften the vehicle, raise the melting point of the Oil of Theobroma by the addition of from 10 to 15 per cent. of Spermaceti, but the melting point must not be raised above 37° C. (98.6° F.).

"For suppositories made with Glycerinated Gelatin the following processes may be used:

"Take of the Medicinal Substances, the prescribed quantity; Glycerin, Glycerinated Gelatin, Water, each, a sufficient quantity. Mix the Medicinal Substance, if solid and soluble in Water or Glycerin, or if a miscible liquid, with a little Water, and add sufficient Glycerin to make the weight of the mixture one-half that of the finished mass. Then thoroughly incorporate it with an equal weight of melted Glycerinated Gelatin, and pour it at once into suitable moulds which have been greased with a small quantity of Petrolatum. Cool the moulds thoroughly before removing the suppositories.

"Moulds for urethral suppositories should be warmed sufficiently before pouring the mass, to facilitate the proper filling of the mould. Suppositories having a firmer consistence may be prepared by substituting Mucilage of Acacia for a portion of the Water or Glycerin.

"If the Medicinal Substance be insoluble in Water or Glycerin, thoroughly levigate it in a warm mortar with a sufficient quantity of Glycerin to make the weight of the mixture one-half that of the furnished mass. Then thoroughly incorporate it with an equal weight of melted Glycerinated Gelatin, and pour it into suitable moulds as above directed. With bulky powders about one-half of the Glycerin may be replaced with Water before levigation. Glycerinated Gelatin suppositories should be protected against the effects of heat and moisture and dry air by keeping them in tightly closed containers in a cool place.

"Rectal suppositories should be cone-shaped or spindle-shaped, and when made from Oil of Theobroma should weigh about 2 Gm.

"Urethral suppositories (bougies) should be pencil-shaped, pointed at one extremity, and either 7 Cm. in length, weighing about 2 Gm., or 14 Cm. in length, weighing about 4 Gm., when made with Glycerinated Gelatin. If prepared with Oil of Theobroma they should weigh about one-half the above quantities.

"Vaginal suppositories should be globular or oviform in shape and weigh about 10 Gm. if made with Glycerinated Gelatin, and about 4 Gm. if made with Oil of Theobroma."

Urethral suppositories are called "bougies," and vaginal suppositories are termed "pessaries." For these, gelatin as a base is often preferable to cacao butter. Suppositories for children should be smaller than those for adults.

Suppositories made with oil of theobroma should be kept in a cool place. During very warm weather in some instances it is necessary to add a small quantity of spermaceti to suppositories made with oil of theobroma.

Suppositories of glycerin are official; they are used per rectum to relieve constipation.

Suppositoria Glycerini (*Suppositories of Glycerin*).—Made by dissolving 0.5 Gm. of Monohydrated Sodium Carbonate in 5 Cc. of Water, adding 30 Gm. of Glycerin and then 2 Gm. of Stearic Acid, heating the mixture carefully until carbon dioxide ceases to be evolved, and until the liquid is clear. The liquid, while still warm, is then poured into suitable moulds to make 10 suppositories. When the suppositories are completely cold, remove them from the moulds and preserve them in tightly stoppered glass vessels.

SYRUPI—Syrups

Syrups are concentrated solutions of sugar in water, or other aqueous liquids. They may be made by dissolving sugar in hot or cold aqueous liquids, or by adding a medicated liquid to ready made syrup. In addition to the syrups used purely on account of their agreeable taste, a number contain distinctly active ingredients. Syrup is not only an agreeable vehicle, but to a certain degree acts as a preservative for many vegetable compounds, and prevents, or retards, chemical changes in some readily oxidizable chemical substances; this is particularly true of the ferrous compounds. Many chemicals are more soluble in syrup than in water. Resinous liquids precipitate more slowly in syrup than in water. Syrups do not keep well during hot weather, this being particularly true of syrup of acacia. Alcohol or alcoholic liquids mixed in equal quantities with syrup causes the sugar to slowly crystallize out of solution. The syrup may be conveniently divided into those used solely, or almost so, as agreeable vehicles, and those possessing medicinal action.

Syrups Used as Vehicles and Flavoring Agents

Syrupus (*Syrup*).—Made by dissolving 85 Gm. of Sugar by the aid of heat in enough Water to make 100 Cc. of syrup.

Dose.—Any desirable quantity.

Syrupus Acaciæ (*Syrup of Acacia*).—Made by dissolving 10 Cc. of Acacia, and 80 Cc. of Sugar, by the aid of heat, in enough Water to make 100 Cc. of syrup of acacia.

Dose.—Any desirable quantity.

Syrupus Acidi Citrici (*Syrup of Citric Acid*).—Made by dissolving 1 Gm. of Citric Acid in 1 Cc. of Distilled Water, mixing with 50 Cc. of Syrup and adding 1 Cc. of Tincture of Fresh Lemon Peel and lastly enough Syrup to make 100 Cc. of syrup of citric acid.

Dose.—Any desirable quantity.

Syrupus Aurantii (*Syrup of Orange*).—Made by triturating 1 Gm. of Magnesium Carbonate in a mortar with 5 Cc. of Tincture of Sweet Orange Peel, gradually adding 40 Cc. of Water, filtering, and adding through the filter enough Water to obtain 45 Cc. of filtrate. In this liquid, 0.5 Gm. of Citric Acid and 82 Gm. of Sugar are dissolved by agitation without heat, and enough water added to make 100 Cc. of syrup orange.

Dose.—Any desirable quantity.

Syrupus Aurantii Florum (*Syrup of Orange Flowers*).—Made by dissolving 85 Gm. of Sugar either by agitation without heat, or by percolation, in enough Orange Flower Water to make 100 Cc. of syrup of orange flowers.

Dose.—Any desirable quantity.

Official Syrups of Medicinal Value

Syrupus Acidi Hydriodici (*Syrup of Hydriodic Acid*).—A syrupy liquid containing about 1 per cent., by weight, of absolute hydriodic acid or about 1.19 Gm. in 100 Cc. made by mixing 10 Gm. of official Hydriodic Acid, with 30 Cc. of Water and 60 Cc. of Syrup, to make 100 Cc. of the syrup. The syrup should be transparent, colorless, or not more than a pale straw color, and have a sweet acidulous taste.

Dose.—2 to 16 Cc.; ½ to 4 f℥.

Syrupus Amygdalæ (*Syrup of Almonds*).—Made by mixing 1 Cc. of Spirit of Bitter Almond with 10 Cc. of Orange Flower Water and enough syrup to make 100 Cc. of the syrup.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Syrupus Calcii Lactophosphatis (*Syrup of Calcium Lactophosphate*).—Made by dissolving 2.5 Gm. of Calcium Phosphate in 6 Cc. of Lactic Acid, adding 3.6 Cc. of Phosphoric Acid diluted with 5 Cc. of Water, stirring until the precipitate first formed is redissolved, adding 15 Cc.

of Water, filtering, adding 5 Cc. of Orange Flower Water and 72.5 Gm. of Sugar to the filtrate, dissolving by agitation without heat, straining, and passing enough Water through the strainer to make 100 Cc. of the syrup.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Syrupus Calcis (*Syrup of Lime, Syrup of Calcium Hydroxide*).—A transparent, pale yellow, mildly caustic liquid, of an alkaline taste and reaction, made by slaking 6.5 Gm. of Lime, 35 Cc. of Water with the aid of heat, triturating in a mortar with 35 Gm. of Sugar, adding 50 Cc. of Boiling Water in a bright copper or tinned iron vessel, boiling for five minutes, diluting with water to make 95 Cc., filtering through white paper, closely covering the funnel during filtration, and then adding enough Water through the filter to make 100 Cc. of the syrup. The syrup should be kept in well-stoppered bottles. In preparing this syrup advantage is taken of the fact that lime with sugar forms a sucrate which is more soluble than lime. The syrup contains a much greater percentage of *calcium hydroxide* in solution than does lime water.

Dose.—2 to 8 Cc.; ½ to 2 f℥.

Syrupus Ferri Iodidi (*Syrup of Ferrous Iodide*).—A transparent, pale green liquid, having a sweet, strongly ferruginous taste and a neutral reaction, prepared by dissolving Sugar in a freshly prepared solution of Ferrous Iodide, and adding about 2 per cent. of Diluted Hypophosphorous Acid for the purpose of converting any unchanged iodine into hydriodic acid. The syrup should contain 5 per cent., by weight, of ferrous iodide.

Dose.—0.3 to 2 Cc.; 5 to 30 minims.

Syrupus Ferri, Quininæ et Strychninæ Phosphatum (*Syrup of the Phosphates of Iron, Quinine, and Strychnine*).—Made by mixing 25 Cc. of Glycerite of the Phosphates of Iron, Quinine, and Strychnine with 75 Cc. of Syrup, to make 100 Cc. of the syrup. Each teaspoonful contains about $1\frac{1}{4}$ grains of soluble ferric phosphate; $1\frac{2}{3}$ grains of quinine, and $\frac{1}{80}$ grain of strychnine.

Dose.—2 to 8 Cc.; 1 to 2 f℥.

Syrupus Hypophosphitum (*Syrup of Hypophosphites*).—A transparent, colorless liquid made by triturating calcium, sodium, and potassium hypophosphites dissolved in sugar and water, by the aid of diluted hypophosphorous acid, and flavoring with tincture of fresh lemon peel. Each teaspoonful contains about 3 grains of Calcium Hypophosphite, and 1 grain each of Sodium Hypophosphite and Potassium Hypophosphite.

Dose.—4 to 16 Cc.; 1 to 4 f℥.

Syrupus Hypophosphitum Compositus (*Compound Syrup of Hypophosphites*).—A faintly yellowish liquid containing calcium, potassium, sodium, iron, and manganese hypophosphites, with quinine and strychnine made into a syrup by means of sugar, water, sodium citrate, and diluted hypophosphorous acid. Each teaspoonful contains about 2

grains of Calcium Hypophosphite, 1 grain of Potassium Hypophosphite, 1 grain of Sodium Hypophosphite, $\frac{1}{6}$ grain each of Manganese Hypophosphite and Ferric Hypophosphite, $\frac{1}{12}$ grain of Quinine, and $\frac{1}{140}$ grain of Strychnine.

Dose.—2 to 8 Cc.; $\frac{1}{2}$ to 2 f℥.

Syrupus Ipecacuanhæ (*Syrup of Ipecac*).—Made by dissolving 7 Cc. of Fluidextract of Ipecac in 30 Cc. of Water to which 1 Cc. of Diluted Acetic Acid has previously been added; after twenty-four hours, filtering, adding enough Water through the filter to make 45 Cc. of filtrate. To this liquid, 10 Cc. of Glycerin is added and 70 Gm. of Sugar dissolved, and finally enough Water added to make 100 Cc. of the syrup.

Dose.—As emetic, 4 to 16 Cc.; 1 to 4 f ℥ as emetic for child. As expectorant, 2 to 4 Cc.; $\frac{1}{2}$ to 1 f℥.

Syrupus Krameriæ (*Syrup of Krameria*).—Made by mixing 45 Cc. of Fluidextract of Krameria with 55 Cc. of Syrup, to make 100 Cc. of syrup.

Dose.—2 to 8 Cc.; $\frac{1}{2}$ to 2 f℥.

Syrupus Lactucarii (*Syrup of Lactucarium*).—Made by mixing 10 Cc. of Tincture of Lactucarium with 20 Cc. of Glycerin, adding 5 Cc. of Orange Flower Water in which 0.1 Gm. of Citric Acid has been previously dissolved, filtering if necessary, and lastly adding enough Syrup to make 100 Cc. of the Syrup.

Dose.—4 to 12 Cc.; 1 to 3 f℥.

Syrupus Picis Liquidæ (*Syrup of Tar*).—Made by mixing the 0.5 Gm. of Tar intimately, in a mortar, with 1 Gm. of clean sand, adding 10 Cc. of Water, kneading the mass thoroughly with the pestle, pouring off the water, and throwing it away. The tar thus washed with water and mixed with sand is treated with 5 Cc. of Alcohol and when dissolved is mixed with 1 Gm. of Magnesium Carbonate and 5 Gm. of Sugar thoroughly triturated in the mortar, adding 40 Cc. of Water; the mixture is stirred occasionally during two hours and then filtered. In the filtrate 80 Gm. of Sugar are then dissolved by the aid of gentle heat, the syrup strained, and enough Water added to make 100 Cc. of the syrup.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Syrupus Pruni Virginianæ (*Syrup of Wild Cherry*).—Made by percolating 15 Gm. of Wild Cherry with a menstruum of Glycerin and Cold Water to make 45 Cc. of infusion. In the strong infusion thus obtained dissolve 70 Gm. of Sugar by agitation without heat to make 100 Cc. of the syrup.

Dose.—2 to 8 Cc.; $\frac{1}{2}$ to 2 f℥.

Syrupus Rhei (*Syrup of Rhubarb*).—Made by mixing 0.4 Cc. of Spirit of Cinnamon with 10 Cc. of Fluidextract of Rhubarb, adding 1 Gm. of Potassium Carbonate previously dissolved in 5 Cc. of water, and lastly enough Syrup to make 100 Cc.

Dose.—2 to 16 Cc.; $\frac{1}{2}$ to 4 f℥.

Syrupus Rhei Aromaticus (*Aromatic Syrup of Rhubarb*). *Synonym,* Spiced Syrup of Rhubarb.—Made by dissolving 0.1 Gm. of Potassium Carbonate in 15 Cc. of Aromatic Tincture of Rhubarb, filtering, if necessary, and then adding a sufficient quantity of Water to make 100 Cc. of syrup.

Dose.—2 to 16 Cc.; ½ to 4 f℥.

Syrupus Rosæ (*Syrup of Rose*).—A clear, colorless liquid having a sweet, acidulous and astringent taste and an acid reaction, made by mixing 12.5 Cc. of Fluidextract of Rose and 1 Cc. of Diluted Sulphuric Acid with 30 Cc. of Water, filtering after two hours, dissolving 75 Gm. of Sugar by agitation in the clear filtrate, and finally, adding enough water to make 100 Cc. of the syrup.

Dose.—Any desirable quantity.

Syrupus Rubi (*Syrup of Rubus*). *Synonym,* Syrup of Blackberry Bark Root.—A syrupy liquid having a sweet and mildly astringent taste made by adding 25 Cc. of Fluidextract of Rubus to enough Syrup to make 100 Cc. of the syrup.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Syrupus Sarsaparillæ Compositus (*Compound Syrup of Sarsaparilla*).—Made by mixing together 20 Cc. of Fluidextract of Sarsaparilla, 1.5 Cc. of Fluidextract of Glycyrrhiza, and 1.5 Cc. of Fluidextract of Senna, adding 0.02 Cc. each of Oils of Sassafras, Anise, and Gaultheria, and enough Water to make 60 Cc. of the mixed liquids, and shaking it well. After the liquid has stood for one hour, filter and dissolve in the filtrate 65 Gm. of Sugar by the aid of a gentle heat, and after cooling, straining and adding enough water to make 100 Cc. of compound syrup of sarsaparilla.

Dose.—Any desirable quantity.

Syrupus Scillæ (*Syrup of Squill*).—A clear, colorless or faintly yellowish liquid, having an acidulous taste and an acid reaction, made by dissolving, by aid of a gentle heat, 60 Gm. of Sugar in 40 Gm. of Vinegar of Squill, straining, and adding enough Water to make 100 Cc. of the syrup.

Dose.—2 to 4 Cc.; ½ to 1 f℥.

Syrupus Scillæ Compositus (*Compound Syrup of Squill*). *Synonym,* Coxe's Hive Syrup.—Made by mixing 8 Cc. of Fluidextract of Squill and 8 Cc. of Fluidextract of Senega, evaporating them in a tared vessel to 10 Gm., mixing with 35 Cc. of Water, and when cold mixing with 2 Gm. of purified talc, filtering, passing enough water through the filter to make 40 Cc. of clear filtrate. To the liquid thus obtained 0.2 Gm. of Antimony and Potassium Tartrate previously dissolved in 2.5 Cc. of Hot Water is added. In this, 75 Gm. of Sugar are dissolved by agitation without heat, the whole is strained, and enough water added to make 100 Cc. of the syrup. Each fluidounce contains about 1 grain of antimony and potassium tartrate.

Dose.—0.6 to 4 Cc.; 10 to 60 minims.

Syrupus Senegæ (*Syrup of Senega*).—Made by mixing 20 Cc. of Fluidextract of Senega with 80 Cc. of Syrup, to make 100 Cc. of the syrup.

Dose.—2 to 8 Cc.; ½ to 2 f℥.

Syrupus Sennæ (*Syrup of Senna*).—Made by mixing 0.5 Cc. of Oil of Coriander with 25 Cc. of Fluidextract of Senna, and adding enough Syrup to make 100 Cc. of the syrup.

Dose.—2 to 8 Cc.; ½ to 2 f℥.

Syrupus Tolutanus (*Syrup of Tolu*).—Made by rubbing 5 Cc. of Tincture of Tolu in a mortar with 1 Gm. of Magnesium Carbonate and 60 Gm. of Sugar; gradually adding 45 Cc. of Water, while constantly triturating and then filtering. In the filtrate thus obtained, 22 Gm. of Sugar are dissolved by the aid of a gentle heat, the whole strained while still hot, and enough Water added to make 100 Cc. of syrup of tolu. Considered of value as a very feeble expectorant, and agreeable vehicle.

Dose.—Any desirable quantity.

Syrupus Zingiberis (*Syrup of Ginger*).—Made by mixing 3 Cc. of Fluidextract of Ginger with 2 Cc. of Alcohol, triturating them in a mortar with 1 Gm. of Magnesium Carbonate and 60 Gm. of Sugar, gradually adding 45 Cc. of water while constantly triturating, and then filtering. In the filtrate thus obtained 22 Gm. of Sugar are dissolved by the aid of gentle heat, the syrup strained while still hot, and enough Water added to make 100 Cc. of syrup of ginger.

Dose.—Any desirable quantity.

TABELLÆ—Tablets

Tablets are disk-shaped bodies made either by compressing the medicinal substance into disks, or by mixing the medicinal substance with sugar, thoroughly triturating, moistening the powder with alcohol to form a paste, and moulding into small disks; those made by compression are known as compressed tablets, while those made by trituration and moulding are known as tablet triturates. Tablet triturates are sometimes made from sugar and alcohol, and then saturated by the addition of a drop of medicated liquid; when made in this way they are known as tablet saturates.

Tablets furnish a convenient method for administering a limited number of substances, but are entirely unsuited for administering many. It is folly to suppose that insoluble powders can be effective if administered in compressed tablets, or that tablets made from volatile substances will retain their strength, and still we have seen members of the medical profession wofully imposed upon by drug sellers offering for sale compressed tablets of such insoluble substances as cerium oxalate and bismuth subnitrate, and such volatile substances as spirit of nitrous ether in tablet triturates. There are no official compressed tablets, or tablet triturates.

TINCTURÆ—Tinctures

Tinctures are alcoholic, or hydro-alcoholic preparations usually made from vegetable substances by the processes of maceration and percolation, or by diluting fluidextracts. They are not of a uniform or definite strength, as are the fluidextracts, but each tincture has its own drug strength, while a number of them are required to possess a definite alkaloidal strength. The tinctures of heroic remedies are 10 per cent. in drug strength. While tinctures are mostly preparations of active drugs, several are made from drugs containing aromatic substances, and are used either as vehicles or to give an agreeable color and taste to extemporaneous mixtures. The tincture of orange peel, the compound tincture of cardamom, the tincture of cinnamon, the compound tincture of lavender, and the tincture of vanilla, are usually employed as agreeable vehicles.

The following are official:

Tinctura Aconiti (*Tincture of Aconite*).—Made by percolating 100 Gm. of Aconite with a menstruum of Alcohol, 7 parts, and Water, 3 parts, to make 1000 Cc. of the tincture. Each 100 Cc. of the tincture should contain 0.045 Gm. of aconitine.

Dose.—0.2 to 0.6 Cc.; 3 to 10 minims.

Tinctura Aloes (*Tincture of Aloes*).—Made by macerating 100 Gm. of Purified Aloes and 200 Gm. of Glycyrrhiza with a menstruum of Diluted Alcohol to obtain 1000 Cc. of the tincture.

Dose.—2 to 8 Cc.; ½ to 2 f℥.

Tinctura Aloes et Myrrhæ (*Tincture of Aloes and Myrrh*).—Made by macerating 100 Gm. of Purified Aloes; 100 Gm. of Myrrh, and 100 Gm. of glycyrrhiza with a menstruum of 7.5 parts of Alcohol and 2.5 parts of Water to obtain 1000 Cc. of the tincture.

Dose.—2 to 8 Cc.; ½ to 2 f℥.

Tinctura Arnicæ (*Tincture of Arnica*).—Made by macerating 200 Gm. of Arnica with Diluted Alcohol to obtain 1000 Cc. of the tincture.

Dose.—0.6 to 0.2 Cc.; 10 to 30 minims.

Tinctura Asafœtidæ (*Tincture of Asafetida*).—Made by macerating 200 Gm. of Asafetida with Alcohol to obtain 1000 Cc. of the tincture.

Dose.—2 to 4 Cc.; ½ to 1 f℥.

Tinctura Aurantii Amari (*Tincture of Bitter Orange Peel*).—Made by percolating 200 Gm. of Bitter Orange Peel with a menstruum of 6 parts of alcohol and 4 parts of Water to obtain 1000 Cc. of the tincture.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Tinctura Aurantii Dulcis (*Tincture of Sweet Orange Peel*).—Made by macerating 500 Gm. of Fresh Sweet Orange Peel with Alcohol to obtain 100 Cc. of the tincture.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Tinctura Belladonnæ Foliorum (*Tincture of Belladonna Leaves*).—Made by percolating 100 Gm. of Belladonna Leaves with Diluted Alcohol to obtain 1000 Cc. of the tincture. Each 100 Cc. of the tincture should contain 0.03 Gm. of alkaloids from belladonna leaves.

Dose.—0.3 to 1 Cc.; 5 to 15 minims.

Tinctura Benzoini (*Tincture of Benzoin*).—Made by macerating 200 Gm. of Benzoin with Alcohol to obtain 1000 Cc. of the tincture.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

Tinctura Benzoini Composita (*Compound Tincture of Benzoin*).—Made by macerating 100 Gm. of Benzoin, 20 Gm. of Purified Aloes, 80 Gm. of Storax and 40 Gm. of Balsam of Tolu with Alcohol to obtain 1000 Cc. of the tincture.

Dose.—2 to 8 Cc.; ½ to 2 f℥.

Tinctura Calendulæ (*Tincture of Calendula*).—Made by percolating 200 Gm. of Calendula with Alcohol to obtain 1000 Cc. of the tincture. *Used* externally.

Tinctura Calumbæ (*Tincture of Calumba*).—Made by percolating 200 Gm. of Calumba with a menstruum of 6 parts of Alcohol and 4 parts of Water to obtain 1000 Cc. of the tincture.

Dose.—2 to 8 Cc.; ½ to 2 f℥.

Tinctura Cannabis Indicæ (*Tincture of Indian Cannabis*).—Made by percolating 100 Gm. of Cannabis Indica with Alcohol to obtain 1000 Cc. of the tincture.

Dose.—0.3 to 2 Cc.; 5 to 30 minims.

Tinctura Cantharidis (*Tincture of Cantharides*).—Made by percolating 100 Gm. of Cantharides with Alcohol to obtain 1000 Cc. of the tincture.

Dose.—0.06 to 0.6 Cc.; 1 to 10 minims.

Tinctura Capsici (*Tincture of Capsicum*).—Made by percolating 100 Gm. of Capsicum with a menstruum of 9.5 parts of Alcohol and 0.5 parts of Water to obtain 1000 Cc. of the tincture.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

Tinctura Cardamomi (*Tincture of Cardamom*).—Made by percolating 200 Gm. of Cardamom with Diluted Alcohol to obtain 1000 Cc. of the tincture.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Tinctura Cardamomi Composita (*Compound Tincture of Cardamom*).—Made by macerating 25 Gm. of Cardamom; 25 Gm. of Saigon Cinnamon, 12 Gm. of Caraway, and 5 Gm. of Cochineal with a menstruum of 9.5 parts of Alcohol and 0.5 part of Glycerin to obtain 1000 Cc. of the tincture.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Tinctura Cimicifugæ (*Tincture of Cimicifuga*).—Made by percolating 200 Gm. of Cimicifuga with a menstruum of Alcohol to obtain 1000 Cc of the tincture.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Tinctura Cinchonæ (*Tincture of Cinchona*).—Made by percolating 200 Gm. of Cinchona with 1000 Cc. of a menstruum of 7.75 parts of Alcohol, 2.50 parts of Water, and 0.75 part of Glycerin, and then with a menstruum of Alcohol, 7.75 parts, and Water, 2.5 parts, to obtain 1000 Cc. of the tincture. Each 100 Cc. of the tincture should contain 0.75 Gm. of anhydrous ether-soluble alkaloids of cinchona.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Tinctura Cinchonæ Composita (*Compound Tincture of Cinchona*).—Made by percolating 100 Gm. of Red Cinchona, 80 Gm. of Bitter Orange Peel, and 20 Gm. of Serpentaria with 1000 Cc. of a menstruum of 6.75 parts of Alcohol, 2.5 parts of Water, and 0.75 part of Glycerin, and then with a menstruum of 6.75 parts of Alcohol and 2.5 parts of Water to obtain 1000 Cc. of the tincture.

Dose.—4 to 15 Cc.; 1 to 4 f℥.

Tinctura Cinnamomi (*Tincture of Cinnamon*).—Made by percolating 200 Gm. of Saigon Cinnamon with 1000 Cc. of a menstruum of 6.75 parts of Alcohol, 2.5 parts of Water, and 0.75 part of Glycerin, and then with a menstruum of 6.75 parts of Alcohol and 2.5 parts of Water to obtain 1000 Cc. of the tincture.

Dose.—2 to 8 Cc.; ½ to 1 f℥.

Tinctura Colchici Seminis (*Tincture of Colchicum Seed*).—Made by percolating 100 Gm. of Colchicum Seed with a menstruum of 6 parts of Alcohol and 4 parts of Water to obtain 1000 Cc. of the tincture. Each 100 Cc. of the tincture should contain 0.04 Gm. of colchicine.

Dose.—1 to 4 Cc.; 16 to 60 f℥.

Tinctura Digitalis (*Tinctura of Digitalis*).—Made by percolating 100 Gm. of Digitalis with a menstruum of Diluted Alcohol to obtain 1000 Cc. of the tincture.

Dose.—0.6 to 1.2 Cc.; 10 to 20 minims.

Tinctura Ferri Chloridi (*Tincture of Ferric Chloride*). *Synonym,* Tincture of Iron.—Made by mixing 350 Cc. of the solution of Ferric Chloride with enough Alcohol to obtain 1000 Cc. of the tincture, and letting it stand in a closed vessel, protected from light, at least three months, and then transferring it to glass-stoppered bottles and keeping it protected from light. This tincture is a hydro-alcoholic solution of ferric chloride, containing not less than 13.28 per cent. of anhydrous salt, corresponding to 4.6 per cent. (4.58) of metallic iron.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

Tinctura Gallæ (*Tincture of Nutgall*).—Made by percolating 200 Gm. of Nutgall with 1000 Cc. of a menstruum of Alcohol, 9 parts, and Glycerin, 1 part, and then with a menstruum of Alcohol to obtain 1000 Cc. of the tincture.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Tinctura Gambir Composita (*Compound Tincture of Gambir*).—Made by macerating 50 Gm. of Gambir and 25 Gm. of Saigon Cinnamon with a menstruum of Diluted Alcohol to obtain 1000 Cc. of the tincture.

Dose.—2 to 8 Cc.; ½ to 2 f℥.

Tinctura Gelsemii (*Tincture of Gelsemium*).—Made by percolating 100 Gm. of Gelsemium with a menstruum of 6.5 parts of Alcohol and 3.5 parts of Water to obtain 1000 Cc. of the tincture.

Dose.—0.6 to 1.2 Cc.; 10 to 20 minims.

Tinctura Gentianæ Composita (*Compound Tincture of Gentian*).—Made by percolating 100 Gm. of Gentian, 40 Gm. of Bitter Orange Peel, and 10 Gm. of Cardamom, with a menstruum of 6 parts of Alcohol and 4 parts of Water to obtain 1000 Cc. of the tincture.

Dose.—2 to 8 Cc.; ½ to 2 f℥.

Tinctura Guaiaci (*Tincture of Guaiac*).—Made by macerating 200 Gm. of Guaiac with a menstruum of Alcohol to obtain 1000 Cc. of the tincture.

Dose.—2 to 4 Cc.; ½ to 1 f℥.

Tinctura Guaiaci Ammoniata (*Ammoniated Tincture of Guaiac*).—Made by macerating 200 Gm. of Guaiac with a menstruum of Aromatic Spirit of Ammonia to obtain 1000 Cc. of the tincture.

Dose.—2 to 4 Cc.; ½ to 1 f℥.

Tinctura Hydrastis (*Tincture of Hydrastis*).—Made by percolating 200 Gm. of Hydrastis with a menstruum of 6.5 parts of Alcohol and 3.5 parts of Water to obtain 1000 Cc. of the tincture. Each 100 Cc. of the tincture should contain not less than 0.4 Gm. of hydrastine.

Dose.—2 to 8 Cc.; ½ to 2 f℥.

Tinctura Hyoscyami (*Tincture of Hyoscyamus*).—Made by percolating 100 Gm. of Hyoscyamus with a menstruum of Diluted Alcohol to obtain 1000 Cc. of the tincture. Each 100 Cc. of the tincture of hyoscyamus should contain not less than 0.007 Gm. of mydriatic alkaloids.

Dose.—2 to 4 Cc.; ½ to 1 f℥.

Tinctura Iodi (*Tincture of Iodine*).—Made by triturating 70 Gm. of Iodine and 50 Gm. of Potassium Iodide rapidly in a mortar to a coarse powder, and transferring it at once to a graduated bottle, rinsing the mortar with several successive portions of Alcohol, and pouring the rinsings into the bottle. Then adding a sufficient quantity of Alcohol, shaking occasionally until the iodine and potassium iodide are dissolved to obtain 1000 Cc. of the tincture.

Dose.—0.2 to 0.3 Cc.; 3 to 5 minims.

Tinctura Ipecacuanhæ et Opii (*Tincture of Ipecac and Opium*).—Made by evaporating 1000 Cc. of the Tincture of Deodorized Opium in a tared dish on a water-bath until it weighs 800 Gm., when it has become cold adding to it 100 Cc. of the Fluidextract of Ipecac, filtering

the mixture, and passing enough Diluted Alcohol through the filter to obtain 1000 Cc. of the tincture.

Dose.—0.3 to 1 Cc.; 5 to 16 minims.

Tinctura Kino (*Tincture of Kino*).—Made by triturating 50 Gm. of Kino and 10 Gm. of Purified Talc with a menstruum of 1.5 parts of Glycerin and 2 parts of Water to form a thin, smooth magma, transferring it to a flask and heating it on a water-bath for about one hour, allowing the flask and its contents to cool, adding a sufficient quantity of Water to make up the loss of weight by evaporation. Then adding 650 Cc. of Alcohol, mixing well, and filtering through purified cotton, keeping the funnel well covered, and finally adding a sufficient quantity of Alcohol through the filter to obtain 1000 Cc. of the tincture.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Tinctura Krameriæ (*Tincture of Krameria*).—Made by percolating 200 Gm. of Krameria with a menstruum of diluted alcohol to obtain 1000 Cc. of the tincture.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Tinctura Lactucarii (*Tincture of Lactucarium*).—Made by beating 500 Gm. of Lactucarium in an iron mortar with clean Sand to a coarse powder, and introducing it into a bottle, adding 2000 Cc. of Purified Petroleum Benzin, corking the bottle tightly and setting it aside for forty-eight hours, frequently agitating the mixture, pouring the mixture on a double filter, and allowing it to drain. Washing the residue, by gradually adding 1500 Cc. of Purified Petroleum Benzin, and allowing the lactucarium to dry by exposure to a current of air. When dried and freed from the odor of benzin, the lactucarium is reduced to a powder, using more sand if necessary, packing it in a conical percolator and percolating it with 700 Cc. of a menstruum of 2 parts of Glycerin and 5 parts of Alcohol, and then with a menstruum of Diluted Alcohol until the lactucarium is exhausted, reserving the first 750 Cc. of the percolate, evaporating the remainder on a water-bath, at a temperature not exceeding 70° C. (158° F.), to 250 Cc., and mixing this with the reserve portion. The mixed liquids are then filtered and enough Diluted Alcohol added through the filter to obtain 1000 Cc. of the tincture.

Dose.—2 to 4 Cc.; ½ to 1 f℥.

Tinctura Lavandulæ Composita (*Compound Tincture of Lavender*).—Made by macerating 20 Gm. of Saigon Cinnamon, 5 Gm. of Cloves, 10 Gm. of Nutmeg, and 10 Gm. of Red Saunders in a mixture of 7.5 parts of Alcohol and 2.5 parts of Water in which 8 Cc. of Oil of Lavender and 2 Cc. of Oil of Rosemary have been dissolved to obtain 1000 Cc. of the tincture.

Dose.—2 to 4 Cc.; ½ to 1 f℥.

Tinctura Limonis Corticis (*Tincture of Lemon Peel*).—Made by macerating 500 Cc. of Fresh Lemon Peel with a sufficient quantity of Alcohol to obtain 1000 Cc. of the tincture.

Dose.—2 to 4 Cc.; ½ to 1 f℥.

Tinctura Lobeliæ (*Tincture of Lobelia*).—Made by percolating 100 Gm. of Lobelia with a menstruum of Diluted Alcohol to obtain 1000 Cc. of the tincture.

Dose.—0.6 to 2 Cc., 10 to 30 minims, as expectorant or depressant; 4 to 8 Cc., 1 to 2 f℥, as emetic.

Tinctura Moschi (*Tincture of Musk*).—Made by triturating 5 Gm. of Musk with 45 Cc. of Water to form a smooth mixture. Transferring this to a bottle and allowing it to macerate twenty-four hours, adding 45 Cc. of Alcohol and macerating the mixture for six days, occasionally shaking. Then filtering through a plain paper filter, and when the liquid has drained off completely, passing enough diluted Alcohol through the filter to obtain 100 Cc. of the tincture.

Dose.—4 to 16 Cc.; 1 to 4 f℥.

Tinctura Myrrhæ (*Tincture of Myrrh*).—Made by macerating 200 Gm. of myrrh with alcohol to obtain 1000 Cc. of the tincture.

Dose.—0.3 to 1 Cc.; 5 to 15 minims.

Tinctura Nucis Vomicæ (*Tincture of Nux Vomica*).—Made by dissolving 20 Gm. of Extract of Nux Vomica in a sufficient quantity of a mixture of 7.5 parts of Alcohol and 2.5 parts of Water to obtain 1000 Cc. of the tincture, and filtering it through a well-covered filter.

Each 100 Cc. of the tincture should contain 0.1 Gm. of strychnine.

Dose.—0.3 to 1.2 Cc.; 5 to 20 minims.

Tinctura Opii (*Tincture of Opium*). *Synonym,* Laudanum.—Made by heating 400 Cc. of Water to boiling, pouring it on 100 Gm. of Granulated Opium contained in a tared vessel, weighing and stirring occasionally during twenty-four hours; then restoring the original weight by adding cold water, then adding 400 Cc. of Alcohol, pouring the mixture into a bottle, and continuing the maceration for forty-eight hours, occasionally shaking. The mixture is then transferred to a percolator, the first portion of the percolate being returned until it runs through clear, and when the liquid has ceased to drop, continue the percolation slowly, pouring on a sufficient quantity of Diluted Alcohol until 1000 Cc. of the tincture has been obtained. Each 100 Cc. of the tincture should contain not less than 1.2 nor more than 1.25 Gm. of crystallizable morphine.

Dose.—0.3 to 1.2 Cc.; 5 to 20 minims.

Tinctura Opii Camphorata (*Camphorated Tincture of Opium*). *Synonym,* Paregoric.—Made by macerating 4 Gm. of Powdered Opium, 4 Gm. of Benzoic Acid, 4 Gm. of Camphor, 4 Cc. of Oil of Anise, with a mixture of 40 Cc. of Glycerin and 950 Cc. of Diluted Alcohol to obtain 1000 Cc. of the tincture.

Dose.—2 to 16 Cc.; ½ to 4 f℥.

Tinctura Opii Deodorati (*Tincture of Deodorized Opium*).—Made by pouring 500 Cc. of Boiling Water on 100 Gm. of Granulated Opium, stirring the mixture frequently during twenty-four hours. Then trans-

ferring the mixture to a percolator, returning the first portion of the percolate until it runs through clear, and when the liquid ceases to drop, continuing the percolation with water until the opium is exhausted. The percolate is then concentrated by evaporating it on a water-bath until it measures 150 Cc., and when cooled shaking it frequently and vigorously for ten minutes with 65 Cc. of Purified Petroleum Benzin. Then adding 10 Cc. of Benzin and shaking for a few minutes, and then carefully separating the second portion of Benzin, and evaporating the remaining liquid in a warm place spontaneously until the odor of Benzin has disappeared, removing the last trace by the heat of a water-bath. The deodorized liquid thus obtained is mixed with 600 Cc. of Water, and the mixture filtered through a paper filter, and then mixing with 200 Cc. of Alcohol, and passing a sufficient quantity of Water through the filter to make 1000 Cc. of the tincture. Each 100 Cc. of the tincture should contain not less than 1.2 nor more than 1.25 Gm. of crystallized morphine.

Dose.—0.3 to 1.2 Cc.; 5 to 20 minims.

Tinctura Physostigmatis (*Tincture of Physostigma*).—Made by percolating 100 Gm. of Physostigma with Alcohol to obtain 1000 Cc. of the tincture. Each 100 Cc. of the tincture should contain 0.014 Gm. of the ether-soluble alkaloids from physostigma.

Dose.—0.3 to 1.2 Cc.; 5 to 20 minims.

Tinctura Pyrethri (*Tincture of Pyrethrum*).—Made by percolating 200 Gm. of Pyrethrum with Alcohol to obtain 1000 Cc. of the tincture. *Used* externally.

Tinctura Quassiæ (*Tincture of Quassia*).—Made by percolating 200 Gm. of Quassia with a menstruum of Alcohol, 3.5 parts, and Water, 6.5 parts, to obtain 1000 Cc. of the tincture.

Dose.—2 to 4 Cc.; ½ to 1 f℥.

Tinctura Quillajæ (*Tincture of Quillaja*).—Made by boiling 200 Gm. of Quillaja in a covered vessel with 800 Cc. of Water for fifteen minutes, straining while hot, and washing the residue on the strainer with 200 Cc. of Water previously heated to boiling. Then evaporating the strained liquid to 600 Cc., allowing it to cool, adding 350 Cc. of Alcohol, and heating it for twenty-four hours. The supernatant clear liquid is decanted, filtered through paper, then pouring the residue on the filter and, when the liquid ceases to drop, washing the filter with a sufficient quantity of Water to make 1000 Cc. of the tincture. *Used* externally.

Tinctura Rhei (*Tincture of Rhubarb*).—Made by percolating 200 Gm. of Rhubarb, and 40 Gm. of Cardamom with 1000 Cc. of a menstruum of Alcohol, 5 parts, Water, 4 parts, and Glycerin, 1 part, and then with a mixture of Alcohol, 5 parts, and Water, 4 parts, to obtain 1000 Cc. of the tincture.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Tinctura Rhei Aromatica (*Aromatic Tincture of Rhubarb*).—Made by percolating 200 Gm. of Rhubarb, 40 Gm. of Saigon Cinnamon, 40 Gm. of Cloves, and 20 Gm. of nutmeg with 1000 Cc. of a menstruum of Alcohol, 5 parts, Water, 4 parts, and Glycerin, 1 part, and then with a mixture of Alcohol, 5 parts, and Water, 4 parts, to obtain 1000 Cc. of the tincture.

Dose.—2 to 4 Cc.; ½ to 1 f℥.

Tinctura Sanguinariæ (*Tincture of Sanguinaria*).—Made by percolating 100 Gm. of Sanguinaria moistened with 20 Cc. of Acetic Acid with a menstruum of Alcohol, 6 parts, and Water, 4 parts, to obtain 1000 Cc. of the tincture.

Dose.—0.3 to 2 Cc.; 5 to 30 minims.

Tinctura Scillæ (*Tincture of Squill*).—Made by macerating 100 Gm. of Squill with successive portions of a mixture of Alcohol, 6.5 parts, and Water, 2.5 parts, to obtain 1000 Cc. of the tincture.

Dose.—0.6 to 1.2 Cc.; 10 to 20 minims.

Tinctura Serpentariæ (*Tincture of Serpentaria*).—Made by percolating 200 Gm. of Serpentaria with a menstruum of Alcohol, 6.5 parts, and Water, 3.5 parts, to obtain 1000 Cc. of the tincture.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Tinctura Stramonii (*Tincture of Stramonium*).—Made by percolating 100 Gm. of Stramonium with a menstruum of Diluted Alcohol to obtain 1000 Cc. of the tincture. Each 100 Cc. of the tincture should contain 0.025 Gm. of mydriatic alkaloids from stramonium.

Dose.—0.3 to 1 Cc.; 5 to 15 minims.

Tinctura Strophanthi (*Tincture of Strophanthus*).—Made by percolating 100 Gm. of Strophanthus with a menstruum of 6.5 parts of Alcohol and 3.5 parts of Water to obtain 1000 Cc. of the tincture.

Dose.—0.2 to 0.5 Cc.; 3 to 8 minims.

Tinctura Tolutana (*Tincture of Tolu*).—Made by macerating 200 Gm. of Balsam of Tolu with 800 Cc. of Alcohol, shaking frequently until dissolved, filtering through paper and passing a sufficient quantity of Alcohol through the filter to make 1000 Cc. of the tincture.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Tinctura Valerianæ (*Tincture of Valerian*).—Made by percolating 200 Gm. of Valerian with a menstruum of 9.5 parts of Alcohol and 2.5 parts of Water to obtain 1000 Cc. of the tincture.

Dose.—4 to 15 Cc.; 1 to 4 f℥.

Tinctura Valerianæ Ammoniata (*Ammoniated Tincture of Valerian*).—Made by percolating 200 Gm. of Valerian with a menstruum of Aromatic Spirit of Ammonia to obtain 1000 Cc. of the tincture.

Dose.—2 to 4 Cc.; ½ to 1 f℥.

Tinctura Vanillæ (*Tincture of Vanilla*).—Made by macerating 100 Gm. of Vanilla with 500 Cc. of a mixture of 6.5 parts of Alcohol and 3.5 parts of Water for twelve hours, and then straining the liquid and

setting it aside. The vanilla is then transferred to a mortar, beaten with 200 Gm. of Coarse Powdered Sugar into a uniform powder, then packing it in a percolator and percolating it with the reserved liquid, and finally with a sufficient quantity of a menstruum of Alcohol, 6.5 parts, and Water, 3.5 parts, to make 1000 Cc. of the tincture.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

Tinctura Veratri (*Tincture of Veratrum*).—Made by percolating 100 Gm. of Veratrum with Alcohol to obtain 1000 Cc. of the tincture.

Dose.—0.06 to 1 Cc.; 1 to 15 minims.

Tinctura Zingiberis (*Tincture of Ginger*).—Made by percolating 200 Gm. of Ginger with Alcohol to obtain 1000 Cc. of the tincture.

Dose.—2 to 4 Cc.; 30 to 60 minims.

Tinctura Herbarum Recentium (*Tincture of Fresh Herbs*).—The *Pharmacopœia* directs that tinctures of fresh herbs, when not otherwise directed, are to be prepared according to the following formula:

The Fresh Herb, cut, bruised, or crushed, 500 Gm.; Alcohol, 1000 Cc. Macerate the Herb with the Alcohol in a closed vessel in a moderately warm place during fourteen days, with constant stirring; then strongly express the liquid and filter it through paper.

TRITURATIONES—Triturates

Triturates are powdered preparations consisting of active principles thoroughly triturated with sugar of milk. When active principles are thoroughly triturated in a mortar with a hard, gritty substance, such as sugar of milk, it is reduced to a very fine state of subdivision, and is therefore rendered more readily active. Sugar of milk is not only hard and gritty, but is inert, permanent in air, and almost tasteless. There is only one official triturate, but those made extemporaneously constitute a large percentage of the prescriptions written.

The following triturate is official:

Trituratio Elaterini (*Triturate of Elaterin*).—Made by mixing and thoroughly triturating 1 Gm. of Elaterin with 9 Gm. of Sugar of Milk.

Dose.—0.02 to 0.04 Gm.; $\frac{1}{3}$ to $\frac{2}{3}$ grain.

TROCHISCI—Troches, or Lozenges

Troches, or lozenges, are cylindrical, triangular, square, or disk-shaped solid preparations intended to be dissolved in the mouth. They are made by triturating medicinal substances with powdered sugar and powdered acacia or tragacanth, or any other suitable gum, adding syrup or water to form a stiff mass, rolling into sheets of the desired thickness, and then, with a lozenge cutter or spatula, dividing into troches of suitable size and shape. Bitter, caustic, pungent, efflorescent, and deliquescent

substances are unsuited for administering in lozenge form. Troches are ordinarily intended for local effect within the mouth or pharynx, although some of them are employed on account of their systemic effect.

The following troches are official:

Trochisci Acidi Tannici (*Troches of Tannic Acid*).—Each troche contains Tannic Acid, about 1 grain (0.06 Gm.); Sugar, about 10 grains (0.06 Gm.); Tragacanth, about $\frac{1}{3}$ grain (0.02 Gm.); Stronger Orange Flower Water, a sufficient quantity.

Dose.—1, as required.

Trochisci Ammonii Chloridi (*Troches of Ammonium Chloride*).—Each troche contains Ammonium Chloride, about $1\frac{1}{2}$ grains (0.10 Gm.); Extract of Glycyrrhiza, about 3 grains (0.20 Gm.); Tragacanth, about $\frac{1}{3}$ grain (0.02 Gm.); Sugar, about 6 grains (0.40 Gm.); Syrup of Tolu, a sufficient quantity.

Dose.—1, as required.

Trochisci Cubebæ (*Troches of Cubeb*).—Each troche contains Oleoresin of Cubeb, about $\frac{1}{3}$ grain (0.02 Gm.); Oil of Sassafras, about $\frac{1}{6}$ grain (0.01 Gm.); Extract of Glycyrrhiza, about 4 grains (0.25 Gm.); Acacia, about 2 grains (0.12 Gm.); Syrup of Tolu, a sufficient quantity.

Dose.—1, as required.

Trochisci Gambir (*Troches of Gambir*).—Each troche contains Gambir, about 1 grain (0.06 Gm.); Sugar, about 10 grains (0.65 Gm.); Tragacanth, about $\frac{1}{3}$ grain (0.02 Gm.); Stronger Orange Flower Water, a sufficient quantity.

Dose.—1, as required.

Trochisci Glycyrrhizæ et Opii (*Troches of Glycyrrhiza and Opium*).—Each troche contains Extract of Glycyrrhiza, about $2\frac{1}{2}$ grains (0.15 Gm.); Powdered Opium, about $\frac{1}{12}$ grain (0.005 Gm.); Acacia, about 2 grains (0.12 Gm.); Sugar, about 3 grains (0.20 Gm.); Oil of Anise, about $\frac{1}{30}$ grain (0.002 Cc.); Water, a sufficient quantity.

Dose.—1, as required.

Trochisci Krameriæ (*Troches of Krameria*).—Each troche contains Extract of Krameria, about 1 grain (0.06 Gm.); Sugar, about 10 grains (0.65 Gm.); Tragacanth, about $\frac{1}{3}$ grain (0.02 Gm.); Stronger Orange Flower Water, a sufficient quantity.

Dose.—1, as required.

Trochisci Potassii Chloratis (*Troches of Potassium Chlorate*).—Each troche contains Potassium Chlorate, $2\frac{1}{2}$ grains (0.15 Gm.); Sugar, about 10 grains (0.6 Gm.); Tragacanth, about $\frac{1}{2}$ grain (0.03 Gm.); Water, a sufficient quantity.

Dose.—1 every three or four hours.

Trochisci Santonini (*Troches of Santonin*).—Each troche contains Santonin, about $\frac{1}{2}$ grain (0.03 Gm.); Sugar, about $13\frac{1}{2}$ grains (0.9 Gm.); Tragacanth, about $\frac{1}{2}$ grain (0.03 Gm.); Stronger Orange Flower Water, a sufficient quantity.

Dose.—1 or 2, night and morning.

Trochisci Sodii Bicarbonatis (*Troches of Sodium Bicarbonate*).—Each troche contains Sodium Bicarbonate, about 3 grains (0.18 Gm.); Sugar, about $8\frac{1}{2}$ grains (0.54 Gm.); Nutmeg, about $\frac{1}{6}$ grain (0.01 Gm.); Mucilage of Tragacanth, a sufficient quantity.

Dose.—1, as required.

UNGUENTA—Ointments.

Ointments are soft, solid, unctuous preparations of such consistency that they melt or liquefy at the temperature of the body. They are intended for local application as protective dressings, or to be used by inunction to obtain a local or systemic effect. The bases for ointments are lard, benzoinated lard, hydrous wool-fat, or cold-cream, petrolatum, glycerite of starch, or boroglycerin. If it is intended that the medicinal substance contained in an ointment shall be absorbed from the skin, benzoinated lard, hydrous wool-fat, lard, or cold cream should form the basis of the ointment; when the ointment is intended as a protective dressing, petrolatum or glycerite of starch are the most suitable vehicles. It is of the utmost importance that ointments should not contain any undissolved or gritty particles, and it is often necessary to thoroughly triturate the medicinal substance with a few drops of water, alcohol, or glycerin before incorporating it with the ointment base.

The following ointments are official:

Unguentum (*Ointment*).—*Synonym*, Simple Ointment.—Made by melting 20 Gm. of White Wax, adding 80 Gm. of Benzoinated Lard, heating gently until liquefied; then stirring the mixture until it congeals. *Used* as an ointment basis.

Unguentum Acidi Borici (*Ointment of Boric Acid*).—Made by melting 10 Gm. of Paraffin, adding 80 Gm. of White Petrolatum, and heating gently for ten minutes; and then gradually adding the hot liquid to 10 Gm. of powdered Boric Acid, contained in a warm mortar, triturating thoroughly, and stirring the mixture until it congeals.

Unguentum Acidi Tannici (*Ointment of Tannic Acid*).—Made by dissolving 20 Gm. of Tannic Acid in 20 Gm. of Glycerin with the aid of a gentle heat, and mixing the solution thoroughly with 60 Gm. of Ointment in a mortar, avoiding the use of iron utensils.

Unguentum Aquæ Rosæ (*Ointment of Rose Water*). *Synonym*, Cold Cream.—Made by reducing 12.5 Gm. of Spermaceti and 12 Gm. of White Wax to fine shavings, melting them at a moderate heat, adding 56 Gm. of Expressed Oil of Almond, stirring and continuing the heat until the mixture is uniform; then gradually adding 19 Gm. of Stronger Rose Water, previously warmed, and in which 0.5 Gm. of Sodium Borate has been dissolved, stirring the mixture rapidly and continuously until it congeals and becomes of a uniform consistence. When the ointment

is to be used as a vehicle for metallic salts, the sodium borate should be omitted.

Unguentum Belladonnæ (*Belladonna Ointment*).—Made by triturating 10 Gm. of Extract of Belladonna Leaves with 5 Cc. of Diluted Alcohol until a smooth mixture is obtained, incorporating with this 20 Gm. of Hydrous Wool-Fat; then adding 65 Gm. of Benzoinated Lard and mixing thoroughly.

Unguentum Chrysarobini (*Chrysarobin Ointment*).—Made by triturating 6 Gm. of Chrysarobin with 94 Gm. of Benzoinated Lard, previously melted, and heat the mixture on a water-bath with occasional stirring for twenty minutes; and then straining and stirring until it congeals.

Unguentum Diachylon (*Diachylon Ointment*).—Made by melting 50 Gm. of lead plaster by applying a gentle heat, adding 49 Gm. of Olive Oil, and mixing thoroughly; then allowing the mixture to cool, and adding 1 Gm. of Oil of Lavender Flowers, and stirring until it congeals. The ointment does not keep well, and should be prepared extemporaneously when wanted.

Unguentum Gallæ (*Nutgall Ointment*).—Made by rubbing 20 Gm. of Powdered Nutgall with 80 Gm. of Ointment gradually added, until they are thoroughly mixed. The use of metallic utensils should be avoided in preparing this ointment.

Unguentum Hydrargyri (*Mercurial Ointment*).—Made by triturating 2 Gm. of Oleate of Mercury in a warm mortar, adding 50 Gm. of Mercury gradually by means of a pipet, and when the globules are completely divided and distributed, setting it aside for fifteen minutes. Melt the 23 Gm. of Prepared Suet and 25 Gm. of Benzoinated Lard, allowing the mixture to partially cool, and adding about 25 Gm. of it to the mercurial mixture, and continuing the trituration until globules of mercury are no longer visible under a lens magnifying ten diameters. Then adding the remainder of the mixture of Prepared Suet and Benzoinated Lard and mixing thoroughly.

Unguentum Hydrargyri Ammoniati (*Ointment of Ammoniated Mercury*).—Made by rubbing 10 Gm. of Ammoniated Mercury with 10 Gm. of melted White Petrolatum, then adding 40 Gm. of White Petrolatum, mixing thoroughly with 40 Gm. of Hydrous Wool-Fat, and stirring the mixture until it congeals.

Unguentum Hydrargyri Dilutum (*Blue Ointment*).—Made by thoroughly mixing 67 Gm. of Mercurial Ointment with 33 Gm. of Petrolatum.

Unguentum Hydrargyri Nitratis (*Ointment of Mercuric Nitrate*). *Synonym,* Citrine Ointment.—Made by heating 76 Gm. of Lard in a capacious glass or porcelain vessel to a temperature of 105° C. (221° F.), then withdrawing the heat and gradually adding 7 Gm. of Nitric Acid. When the reaction has moderated, reapplying the heat until effervescence has ceased, and allowing the mixture to cool to about 40° C.

(104° F.). Then dissolving 10 Gm. of Mercury in 10.5 Gm. of Nitric Acid, using sufficient heat to prevent the solution from crystallizing, and adding to it the acidified mixture. When the mixture begins to congeal it is stirred thoroughly with a wooden spatula until it is of a bright citrine color. Contact with metallic utensils should be avoided.

Unguentum Hydrargyri Oxidi Flavi (*Ointment of Yellow Mercuric Oxide*).—Made by triturating 10 Gm. of Yellow Mercuric Oxide with 10 Gm. of Water until the mixture is perfectly smooth, then adding 40 Gm. of Hydrous Wool-Fat in divided portions, and incorporating it with 40 Gm. of Petrolatum. The use of metallic utensils should be avoided.

Unguentum Hydrargyri Oxidi Rubri (*Ointment of Red Mercuric Oxide*).—Made by triturating 10 Gm. of Red Mercuric Oxide in very fine powder with 10 Gm. of Water until the mixture is perfectly smooth and absolutely free from gritty particles, then adding 40 Gm. of Hydrous Wool-Fat in divided portions, and incorporating it thoroughly with 40 Gm. of Petrolatum. The use of metallic utensils should be avoided.

Unguentum Iodi (*Iodine Ointment*).—Made by triturating 4 Gm. of Iodine and 4 Gm. of Potassium Iodide in a glass mortar with 12 Cm. of Glycerin until dissolved, then gradually incorporating 80 Gm. of Benzoinated Lard and mixing thoroughly. The use of metallic utensils should be avoided. The ointment should be prepared extemporaneously when wanted.

Unguentum Iodoformi (*Iodoform Ointment*).—Made by thoroughly triturating 10 Gm. of Iodoform with 20 Gm. of Lard, then incorporating 70 Gm. of Lard.

Unguentum Phenolis (*Ointment of Phenol*). *Synonym*, Carbolated Vaseline.—Made by melting 97 Gm. of White Petrolatum, adding 3 Gm. of Phenol, and stirring the mixture until it congeals.

Unguentum Picis Liquidæ (*Tar Ointment*).—Made by melting 15 Gm. of Yellow Wax, adding 35 Gm. of Lard, and to the melted mixture adding 50 Gm. of Tar, previously warmed, and incorporating thoroughly; the mixture is then strained through muslin and stirred until it congeals.

Unguentum Potassii Iodidi (*Ointment of Potassium Iodide*).—Made by dissolving 10 Gm. of Potassium Iodide and 0.6 Gm. of Potassium Carbonate in 10 Gm. of Water by trituration, then gradually adding 80 Gm. of Benzoinated Lard and incorporating thoroughly. The ointment should be prepared extemporaneously.

Unguentum Stramonii (*Stramonium Ointment*).—Made by triturating 10 Gm. of Extract of Stramonium with 5 Cc. of Diluted Alcohol to form a smooth mixture; with this incorporating 20 Gm. of Hydrous Wool-Fat, and then adding 65 Gm. of Benzoinated Lard, and mixing thoroughly.

Unguentum Sulphuris (*Sulphur Ointment*).—Made by rubbing 15 Gm. of Washed Sulphur with 85 Gm. of Benzoinated Lard, gradually added until they are thoroughly mixed.

Unguentum Veratrinæ (*Veratrine Ointment*).—Made by rubbing 4 Gm. of Veratrine with 6 Gm. of Expressed Oil of Almond, then gradually adding 90 Gm. of Benzoinated Lard, and mixing thoroughly. Being highly toxic in large quantities, it should be applied in small quantities only.

Unguentum Zinci Oxidi (*Ointment of Zinc Oxide*). *Synonym,* Zinc Ointment.—Made by rubbing 20 Gm. of finely powdered Zinc Oxide, which must be free from gritty particles, with 20 Gm. of Melted Benzoinated Lard, and then incorporating with the mixture 60 Gm. of Benzoinated lard, previously melted; if necessary, straining the ointment while warm, and stirring thoroughly until it congeals.

Unguentum Zinci Stearatis (*Ointment of Zinc Stearate*).—Made by melting 50 Gm. of White Petrolatum on a water-bath, adding 50 Gm. of finely powdered Zinc Stearate, continuing the heat until the mixture becomes smooth, and then stirring until it congeals.

VINA—Wines

Medicated wines are a class of liquid preparations similar in many respects to tinctures, white wine being used as a menstruum instead of alcohol. They are, as a rule, agreeable to the taste, and freely miscible with either alcoholic or aqueous liquids. It should not be inferred that the medicated wines are mild medicinal preparations. A majority of them are solutions of toxic substances. The following are official.

Vinum Album (*White Wine*).—An alcoholic liquid made by fermenting the juice of fresh grapes, the fruit of *Vitis Vinifera,* freed from seeds, stems, skins, and subjected to the usual cellar treatment for fining and aging. It should contain not less than 7 per cent., nor more than 12 per cent., by weight (8.5 per cent. to 15 per cent. by volume), of absolute alcohol. Used in making the official medicated wines.

Dose.—As required.

Vinum Antimonii (*Wine of Antimony*).—Made by dissolving 0.4 Gm. of Antimony and Potassium Tartrate in 6.5 Cc. of Boiling Distilled Water, adding this to a mixture of 17.5 Cc. of Alcohol with 72.5 Cc. of White Wine; mixing well and allowing the mixture to stand until cool, then filtering and adding sufficient white wine through the filter to make 100 Cc. of the wine.

Dose.—0.6 to 2 Cc.; 10 to 30 minims.

Vinum Cocæ (*Wine of Coca*).—Made by dissolving 6.5 Gm. of Sugar in 50 Cc. of Red Wine, adding 7.5 Cc. of Alcohol, 6.5 Cc. of Fluidextract of Coca, and enough Red Wine to make the wine measure 100 Cc., setting the liquid aside for two days and then filtering.

Dose.—8 to 30 Cc.; 2 to 8 f℥.

Vinum Colchici Seminis (*Wine of Colchicum Seed*).—Made by mixing 10 Cc. of Fluidextract of Colchicum Seed, 15 Cc. of Alcohol, and 75 Cc.

of White Wine, to make 100 Cc., setting aside for two days, and then filtering.

Dose.—1 to 4 Cc.; 15 to 60 minims.

Vinum Ergotæ (*Wine of Ergot*).—Made by mixing 20 Cc. of Fluidextract of Ergot, 5 Cc. of Alcohol, and 75 Cc. of White Wine, setting the mixture aside for two days, and then filtering.

Dose.—4 to 16 Cc.; 1 to 4 f℥.

Vinum Ferri (*Wine of Iron*).—Made by dissolving 4 Gm. of Iron and Ammonium Citrate in 70 Cc. of White Wine, flavoring by the addition of 8 Cc. of Tincture of Sweet Orange Peel, sweetening by the addition of 10 Cc. of Syrup, and then adding enough White Wine to make 100 Cc. The mixture is set aside for two days and then filtered.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Vinum Ferri Amarum (*Bitter Wine of Iron*).—Made by dissolving 5 Gm. of Soluble Iron and Quinine Citrate in 50 Cc. of White Wine, adding to this 6 Cc. of Tincture of Sweet Orange Peel, 30 Cc. of Syrup, and lastly enough White Wine to make the product measure 100 Cc., setting the mixture aside and filtering after two days.

Dose.—4 to 8 Cc.; 1 to 2 f℥.

Vinum Ipecacuanhæ (*Wine of Ipecac*).—Made by mixing 10 Cc. of Fluidextract of Ipecac, 10 Cc. of Alcohol, and 80 Cc. of White Wine; setting aside for two days and filtering.

Dose.—0.6 to 2 Cc., 10 to 30 minims, as expectorant; 1 f℥, as emetic for child.

Vinum Opii (*Wine of Opium*). *Synonym*, Sydenham's Laudanum.—Made by macerating for seven days 10 Gm. of Granulated Opium, 1 Gm. of Saigon Cinnamon, and 1 Gm. of Cloves in 75 Cc. of a mixture composed of 15 Cc. of Alcohol and 85 Cc. of White Wine, filtering, and adding enough of the above-named menstruum to make 100 Cc. of the wine.

Dose.—0.3 to 1.2 Cc.; 5 to 20 minims.

Vinum Rubrum (*Red Wine*).—An alcoholic liquid, made by fermenting the juice of fresh red-colored grapes, the fruit of *Vitis Vinifera* in the presence of their skins, and subjecting to the usual cellar treatment for fining and aging. It should contain not less than 7 per cent. nor more than 12 per cent., by weight (8.5 per cent. to 15 per cent., by volume), of absolute alcohol. Used in making wine of coca.

Dose.—As required.

APPENDIX

Table of all official remedies with their average approximate doses for adults, according to the Eighth Decennial Revision of the *United States Pharmacopœia.* Abstract from the *Pharmacopœia:*

"Doses: After each pharmacopœial article (drug, chemical, or preparation) which is used or likely to be used internally or hypodermically, the committee is instructed to state the average approximate (but neither a minimum nor a maximum) dose for adults and, where deemed advisable, for children. The metric system to be used, and the approximate equivalent ordinary weights or measures inserted in parenthesis. It is to be distinctly understood that neither this convention nor the Committee of Revision created by it intends to have these doses regarded as obligatory on the physician or as forbidding him to exceed them whenever in his judgment this seems advisable. The committee is directed to make a distinct declaration to this effect in some prominent place in the new *Pharmacopœia.*"

	Dose	Dose
Acacia, Acacia		
Acetanilidum, Acetanilide	0.25 Gm.	4 grains
Acetonum, Acetone		
Acetphenetidinum, Acetphenetidin	0.5 Gm.	7½ grains
Acetum Opii, Vinegar of Opium	0.5 Cc.	8 mins.
Acetum Scillæ, Vinegar of Squill	1. Cc.	15 mins.
Acidum Aceticum Dilutum, Diluted Acetic Acid	2. Cc.	30 mins.
Acidum Aceticum Glaciale		
Acidum Benzoicum, Benzoic Acid	0.5 Gm.	7½ grains
Acidum Boricum, Boric Acid	0.5 Gm.	7½ grains
Acidum Camphoricum, Camphoric Acid	1. Gm.	15 grains
Acidum Citricum, Citric Acid	0.5 Gm.	7½ grains
Acidum Gallicum, Gallic Acid	1. Gm.	15 grains
Acidum Hydriodicum Dilutum, Diluted Hydriodic Acid	0.5 Cc.	8 mins.
Acidum Hydrobromicum Dilutum, Diluted Hydrobromic Acid	4. Cc.	1 fl. dr.
Acidum Hydrochloricum		
Acidum Hydrochloricum Dilutum, Diluted Hydrochloric Acid	1. Cc.	15 minims
Acidum Hydrocyanicum Dilutum, Diluted Hydrocyanic Acid	0.1 Cc.	1½ grains
Acidum Hypophosphorosum		grains
Acidum Hypophosphorosum Dilutum, Diluted Hypophosphorous Acid	0.5 Cc.	15 grains
Acidum Lacticum, Lactic Acid	2. Cc.	15 grains
Acidum Nitricum, Nitric Acid		
Acidum Nitricum Dilutum, Diluted Nitric Acid	2. Cc.	15 grains
Acidum Nitrohydrochloricum, Nitrohydrochloric Acid	0.2 Cc.	7½ grains
Acidum Nitrohydrochloricum Dilutum, Diluted Nitrohydrochloric Acid	1. Cc.	½ grains
Acidum Oleicum, Oleic Acid		15 grains
Acidum Phosphoricum, Phosphoric Acid		
Acidum Phosphoricum Dilutum, Diluted Phosphoric Acid	2. Cc.	15 grains

	Dose	Dose
Acidum Salicylicum, Salicylic Acid	0.5 Gm.	7½ grains
Acidum Stearicum, Stearic Acid		
Acidum Sulphuricum, Sulphuric Acid		
Acidum Sulphuricum Aromaticum, Aromatic Sulphuric Acid	1. Cc.	15 mins.
Acidum Sulphuricum Dilutum, Diluted Sulphuric Acid	2. Cc.	30 mins.
Acidum Sulphurosum, Sulphurous Acid	2. Cc.	mins.
Acidum Tannicum, Tannic Acid	0.5 Gm.	
Acidum Tartaricum, Tartaric Acid	0.5 Gm.	
Acidum Trichloraceticum, Trichloracetic Acid		
Aconitina, Aconitine	0.00015 Gm.	
Aconitum, Aconite	0.065 Gm.	
Adeps, Lard		
Adeps Benzoinatus, Benzoinated Lard		
Adeps Lanæ, Wool-Fat		
Adeps Lanæ Hydrosus, Hydrous Wool-Fat		
Æther, Ether	1. Cc.	
Æther Aceticus, Acetic Ether	1. Cc.	
Æthylis Carbamas, Ethyl Carbamate	1. Gm.	
Æthylis Chloridum, Ethyl Chloride		
Alcohol Absolutum, Absolute Alcohol		
Alcohol, Alcohol		
Alcohol Dilutum, Diluted Alcohol		
Aloe, Aloes	0.25 Gm.	
Aloe Purificata, Purified Aloes	0.25 Gm.	
Aloinum, Aloin	0.065 Gm	
Althæa, Althæa		
Alumen, Alum	0.5 Gm.	
Alumen Exsiccatum, Exsiccated Alum		
Alumini Hydroxidum, Aluminum Hydroxide		
Alumini Sulphas, Aluminum Sulphate		
Ammonii Benzoas, Ammonium Benzoate	1. Gm.	
Ammonii Bromidum, Ammonium Bromide	1. Gm.	
Ammonii Carbonas, Ammonium Carbonate	0.25 Gm.	4 grains
Ammonii Chloridum, Ammonium Chloride	0.5 Gm.	7½ grains
Ammonii Iodidum, Ammonium Iodide	0.25 Gm.	4 grains
Ammonii Salicylas, Ammonium Salicylate	0.25 Gm.	4 grains
Ammonii Valeras, Ammonium Valerate	0.5 Gm.	7½ grains
Amygdala Amara, Bitter Almond		
Amygdala Dulcis, Sweet Almond		
Amylis Nitris, Amyl Nitrite	0.2 Cc.	3 mins.
Amylum, Starch, Corn Starch		
Anisum, Anise	0.5 Gm.	7½ grains
Anthemis, Anthemis	2. Gm.	30 grains
Antimonii et Potassii Tartras, Antimony and Potassium Tartrate	expectorant, 0.005 Gm.	1/10 grain
	emetic, 0.03 Gm.	½ grain
Antipyrina, Antipyrine	0.25 Gm.	4 grains
Apocynum, Apocynum	1. Gm.	15 grains
Apomorphinæ Hydrochloridum, Apomorphine Hydrochloride	expectorant, 0.002 Gm.	1/30 grain
	emetic, 0.005 Gm.	1/10 grain
Aquæ Medicatæ, Medicated Waters		
Aqua, Water		
Ammoniæ, Ammonia Water	1. Cc.	15 mins.
Ammoniæ Fortior, Stronger Ammonia Water		
Amygdalæ Amaræ, Bitter Almond Water	4. Cc.	1 fl. dr.
Anisi, Anise Water	16. Cc.	4 fl. dr.
Aurantii Florum Fortior, Stronger Orange Flower Water	8. Cc.	2 fl. dr.
Aurantii Florum, Orange Flower Water	16. Cc.	4 fl. dr.
Camphoræ, Camphor Water	8. Cc.	2 fl. dr.

	Dose	Dose
Aqua Chloroformi, Chloroform Water	16. Cc.	4 fl. dr.
Aqua Cinnamomi, Cinnamon Water	16. Cc.	4 fl. dr.
Aqua Creosoti, Creosote Water	8. Cc.	2 fl. dr.
Aqua Destillata, Distilled Water		
Aqua Fœniculi, Fennel Water	16. Cc.	4 fl. dr.
Aqua Hamamelidis, Hamamelis Water	8. Cc.	2 fl. dr.
Aqua Hydrogenii Dioxidi, Solution of Hydrogen Dioxide	4. Cc.	1 fl. dr.
Aqua Menthæ Piperitæ, Peppermint Water	16. Cc.	4 fl. dr.
Aqua Menthæ Viridis, Spearmint Water	16. Cc.	4 fl. dr.
Aqua Rosæ, Rose Water	16. Cc.	4 fl. dr.
Aqua Rosæ Fortior, Stronger Rose Water	8. Cc.	2 fl. dr.
Argenti Cyanidum, Silver Cyanide		
Argenti Nitras Fusus, Molded Silver Nitrate		
Argenti Nitras Mitigatus, Mitigated Silver Nitrate		
Argenti Nitras, Silver Nitrate	0.01 Gm.	$\frac{1}{5}$ grain
Argenti Oxidum, Silver Oxide	0.065 Gm.	1 grain
Arnica, Arnica	1. Gm.	15 grains
Arseni Iodidum, Arsenous Iodide	0.005 Gm.	$\frac{1}{10}$ grain
Arseni Trioxidum, Arsenic Trioxide	0.002 Gm.	$\frac{1}{30}$ grain
Asafœtida, Asafetida	0.25 Gm.	4 grains
Aspidium, Aspidium	4. Gm.	60 grains
Atropina, Atropine	0.0004 Gm.	$\frac{1}{160}$ grain
Atropinæ Sulphas, Atropine Sulphate	0.0004 Gm.	$\frac{1}{160}$ grain
Aurantii Amari Cortex, Bitter Orange Peel	1. Gm.	15 grains
Aurantii Dulcis Cortex, Sweet Orange Peel	1. Gm.	15 grains
Auri et Sodii Chloridum, Gold and Sodium Chloride	0.005 Gm.	$\frac{1}{10}$ grain
Balsamum Peruvianum, Balsam of Peru	1. Gm.	15 grains
Balsamum Tolutanum, Balsam of Tolu	1. Gm.	15 grains
Belladonnæ Folia, Belladonna Leaves	0.065 Gm.	1 grain
Belladonnæ Radix, Belladonna Root	0.045 Gm.	$\frac{3}{4}$ grain
Benzaldehydum, Benzaldehyde	0.03 Cc.	$\frac{1}{2}$ min.
Benzinum, Petroleum Benzin		
Benzinum Purificatum, Purified Petroleum Benzin		
Benzoinum, Benzoin	1. Gm.	15 grains
Benzosulphinidum, Benzosulphinide, Saccharin	0.2 Gm.	3 grains
Berberis, Berberis	2. Gm.	30 grains
Betanaphthol, Betanaphthol	0.25 Gm.	4 grains
Bismuthi Citras, Bismuth Citrate	0.125 Gm.	2 grains
Bismuthi et Ammonii Citras, Bismuth and Ammonium Citrate	0.125 Gm.	2 grains
Bismuthi Subcarbonas, Bismuth Subcarbonate	0.5 Gm.	$7\frac{1}{2}$ grains
Bismuthi Subgallas, Bismuth Subgallate	0.25 Gm.	4 grains
Bismuthi Subnitras, Bismuth Subnitrate	0.5 Gm.	$7\frac{1}{2}$ grains
Bismuthi Subsalicylas, Bismuth Subsalicylate	0.25 Gm.	4 grains
Bromoformum, Bromoform	0.2 Cc.	3 mins.
Bromum, Bromine		
Buchu, Buchu	2. Gm.	30 grains
Caffeina, Caffeine	0.065 Gm.	1 grain
Caffeina Citrata, Citrated Caffeine	0.125 Gm.	2 grains
Caffeina Citrata Effervescens, Effervescent Citrated Caffeine	4 Gm.	60 grains
Calamus, Calamus	1 Gm.	15 grains
Calcii Bromidum, Calcium Bromide	1 Gm.	15 grains
Calcii Carbonas Præcipitatus, Precipitated Calcium Carbonate	1. Gm.	15 grains
Calcii Chloridum, Calcium Chloride	0.5 Gm.	$7\frac{1}{2}$ grains
Calcii Hypophosphis, Calcium Hypophosphite	0.5 Gm.	$7\frac{1}{2}$ grains
Calcii Phosphas Præcipitatus, Precipitated Calcium Phosphate	1. Gm.	15 grains
Calcii Sulphas Exsiccatus, Exsiccated Calcium Sulphate		
Calendula, Calendula	1. Gm.	15 grains

	Dose	Dose
Calumba, Calumba	2. Gm.	30 grains
Calx Chlorinata, Chlorinated Lime, Chlorinated Calcium Oxide	0.25 Gm.	4 grains
Calx, Lime, Calcium Oxide		
Calx Sulphurata, Sulphurated Lime	0.065 Gm.	1 grain
Cambogia, Gamboge	0.125 Gm.	2 grains
Camphora, Camphor	0.125 Gm.	2 grains
Camphora Monobromata, Monobromated Camphor	0.125 Gm.	2 grains
Cannabis Indica, Indian Cannabis	0.065 Gm.	1 grain
Cantharis, Cantharides	0.03 Gm.	½ grain
Capsicum, Capsicum	0.065 Gm.	1 grain
Carbo Animalis, Animal Charcoal		
Carbo Animalis Purificatus, Purified Animal Charcoal		
Carbo Ligni, Charcoal	1. Gm.	15 grains
Carbonei Disulphidum, Carbon Disulphide		
Cardamomum, Cardamom	1. Gm.	15 grains
Carum, Caraway	1. Gm.	15 grains
Caryophyllus, Cloves	0.25 Gm.	4 grains
Cassia Fistula, Cassia Fistula	4. Gm.	60 grains
Cataplasma Kaolini, Cataplasm of Kaolin		
Cera Alba, White Wax		
Cera Flava, Yellow Wax		
Ceratum, Cerate		
Ceratum Camphoræ, Camphor Cerate		
Ceratum Cantharidis, Cantharides Cerate		
Ceratum Plumbi Subacetatis, Cerate of Lead Subacetate		
Ceratum Resinæ Compositum, Compound Rosin Cerate		
Ceratum Resinæ, Rosin Cerate		
Cerii Oxalas, Cerium Oxalate	0.065 Gm.	1 grain
Cetaceum, Spermaceti		
Charta Sinapis, Mustard Paper		
Chimaphila, Chimaphila	2. Gm.	30 grains
Chirata, Chirata	1. Gm.	15 grains
Chloralformamidum, Chloralformamide	1. Gm.	15 grains
Chloralum Hydratum, Hydrated Chloral	1. Gm.	15 grains
Chloroformum, Chloroform	0.3 Cc.	5 mins.
Chondrus, Chondrus, in decoction	15. Gm.	4 drams
Chromii Trioxidum, Chromium Trioxide		
Chrysarobinum, Chrysarobin	0.03 Gm.	½ grain
Cimicifuga, Cimicifuga	1. Gm.	15 grains
Cinchona, Cinchona	1. Gm.	15 grains
Cinchona Rubra, Red Cinchona	1. Gm.	15 grains
Cinchonidinæ Sulphas, Cinchonidine Sulphate	0.25 Gm.	4 grains
Cinchoninæ Sulphas, Cinchonine Sulphate	0.25 Gm.	4 grains
Cinnaldehydum, Cinnamic Aldehyde	0.05 Cc.	1 min.
Cinnamomum Saigonicum, Saigon Cinnamon	0.25 Gm.	4 grains
Cinnamomum Zeylanicum, Ceylon Cinnamon	0.25 Gm.	4 grains
Coca, Coca	2. Gm.	30 grains
Cocaina, Cocaine	0.03 Gm.	½ grain
Cocainæ Hydrochloridum, Cocaine Hydrochloride	0.03 Gm.	½ grain
Coccus, Cochineal		
Codeina, Codeine	0.03 Gm.	½ grain
Codeinæ Phosphas, Codeine Phosphate	0.03 Gm.	½ grain
Codeinæ Sulphas, Codeine Sulphate	0.03 Gm.	½ grain
Colchici Cormus, Colchicum Corm	0.25 Gm.	4 grains
Colchici Semen, Colchicum Seed	0.2 Gm.	3 grains
Colchicina, Colchicine	0.0005 Gm.	$\frac{1}{1\,2\,5}$ grain
Collodium Cantharidatum, Cantharidal Collodion		
Collodium, Collodion		
Collodium Flexile, Flexible Collodion		
Collodium Stypticum, Styptic Collodion		
Colocynthis, Colocynth	0.065 Gm.	1 grain

	Dose	Dose
Confectio Rosæ, Confection of Rose		
Confectio Sennæ, Confection of Senna	4. Gm.	60 grains
Conium, Conium	0.2 Gm.	3 grains
Convallaria, Convallaria	0.5 Gm.	7½ grains
Copaiba, Copaiba	1. Cc.	15 mins.
Coriandrum, Coriander	0.5 Gm.	7½ grains
Creosotum, Creosote	0.2 Cc.	3 mins.
Cresol, Cresol	0.05 Cc.	1 min.
Creta Præparata, Prepared Chalk	1. Gm.	15 grains
Cubeba, Cubeb	1. Gm.	15 grains
Cupri Sulphas, Copper Sulphate	astringent, 0.01 Gm. emetic, 0.25 Gm.	⅕ grain 4 grains
Cusso, Kousso	16. Gm.	240 grains
Cypripedium, Cypripedium	1. Gm.	15 grains
Decocta, Decoctions		
Digitalis, Digitalis	0.065 Gm.	1 grain
Elastica, Rubber		
Elaterinum, Elaterin	0.005 Gm.	$\frac{1}{10}$ grain
Elixir Adjuvans, Adjuvant Elixir		
Elixir Aromaticum, Aromatic Elixir		
Elixir Ferri, Quininæ et Strychninæ Phosphatum, Elixir of Iron, Quinine, and Strychnine Phosphates	4. Cc.	1 fl. dr.
Emplastrum Adhæsivum, Adhesive Plaster		
Emplastrum Belladonnæ, Belladonna Plaster		
Emplastrum Capsici, Capsicum Plaster		
Emplastrum Hydrargyri, Mercurial Plaster		
Emplastrum Opii, Opium Plaster		
Emplastrum Plumbi, Lead Plaster		
Emplastrum Saponis, Soap Plaster		
Emulsum Amygdalæ, Emulsion of Almond	120. Cc.	4 fl. oz.
Emulsum Asafœtidæ, Emulsion of Asafetida	16. Cc.	4 fl. dr.
Emulsum Chloroformi, Emulsion of Chloroform	8. Cc.	2 fl. dr.
Emulsum Olei Morrhuæ cum Hypophosphitibus, Emulsion of Cod-liver Oil with Hypophosphites	8. Cc.	2 fl. dr.
Emulsum Olei Morrhuæ, Emulsion of Cod-liver Oil	8. Cc.	2 fl. dr.
Emulsum Olei Terebinthinæ, Emulsion of Oil of Turpentine	4. Cc.	1 fl. dr.
Ergota, Ergot	2. Gm.	30 grains
Eriodictyon, Eriodictyon	1. Gm.	15 grains
Eucalyptol, Eucalyptol	0.3 Cc.	5 mins.
Eucalyptus, Eucalyptus	2. Gm.	30 grains
Eugenol, Eugenol	0.2 Cc.	3 mins.
Euonymus, Euonymus	0.5 Gm.	7½ grains
Eupatorium, Eupatorium	2. Gm.	30 grains
Extractum Aloes, Extract of Aloes	0.125 Gm.	2 grains
Extractum Belladonnæ Foliorum, Extract of Belladonna Leaves	0.01 Gm.	⅙ grain
Extractum Cannabis Indicæ, Extract of Indian Cannabis	0.01 Gm.	⅙ grain
Extractum Cimicifugæ, Extract of Cimicifuga	0.25 Gm.	4 grains
Extractum Colchici Cormi, Extract of Colchicum Corm	0.065 Gm.	1 grain
Extractum Colocynthidis Compositum, Compound Extract of Colocynth	0.5 Gm.	7½ grains
Extractum Colocynthidis, Extract of Colocynth	0.03 Gm.	½ grain
Extractum Digitalis, Extract of Digitalis	0.01 Gm.	⅙ grain
Extractum Ergotæ, Extract of Ergot	0.25 Gm.	4 grains
Extractum Euonymi, Extract of Euonymus	0.125 Gm.	2 grains
Extractum Gentianæ, Extract of Gentian	0.25 Gm.	4 grains
Extractum Glycyrrhizæ, Extract of Glycyrrhiza	1. Gm.	15 grains
Extractum Glycyrrhizæ Purum, Pure Extract of Glycyrrhiza	1. Gm.	15 grains

	Dose	Dose
Extractum Hæmatoxyli, Extract of Hematoxylon	1. Gm.	15 grains
Extractum Hyoscyami, Extract of Hyoscyamus	0.065 Gm.	1 grain
Extractum Krameriæ, Extract of Krameria	0.5 Gm.	7½ grains
Extractum Leptandræ, Extract of Leptandra	0.25 Gm.	4 grains
Extractum Malti, Extract of Malt	16. Cc.	4 fl. dr.
Extractum Nucis Vomicæ, Extract of Nux Vomica	0.015 Gm.	¼ grain
Extractum Opii, Extract of Opium	0.03 Gm.	½ grain
Extractum Physostigmatis, Extract of Physostigma	0.008 Gm.	⅛ grain
Extractum Quassiæ, Extract of Quassia	0.065 Gm.	1 grain
Extractum Rhamni Purshianæ, Extract of Cascara Sagrada	0.25 Gm.	4 grains
Extractum Rhei, Extract of Rhubarb	0.25 Gm.	4 grains
Extractum Scopolæ, Extract of Scopola	0.01 Gm.	⅙ grain
Extractum Stramonii, Extract of Stramonium	0.01 Gm.	⅙ grain
Extractum Sumbul, Extract of Sumbul	0.25 Gm.	4 grains
Extractum Taraxaci, Extract of Taraxacum	1. Gm.	15 grains
Fel Bovis, Oxgall		
Fel Bovis Purificatum, Purified Oxgall	0.5 Gm.	7½ grains
Ferri Carbonas Saccharatus, Saccharated Ferrous Carbonate	0.25 Gm.	4 grains
Ferri Chloridum, Ferric Chloride	0.065 Gm.	1 grain
Ferri Citras, Ferric Citrate	0.25 Gm.	4 grains
Ferri et Ammonii Citras, Iron and Ammonium Citrate	0.25 Gm.	4 grains
Ferri et Ammonii Sulphas, Iron Ammonium Sulphate	0.5 Gm.	7½ grains
Ferri et Ammonii Tartras, Iron and Ammonium Tartrate	0.25 Gm.	4 grains
Ferri et Potassii Tartras, Iron and Potassium Tartrate	0.25 Gm.	4 grains
Ferri et Quininæ Citras, Iron and Quinine Citrate	0.25 Gm.	4 grains
Ferri et Quininæ Citras Solubilis, Soluble Iron and Quinine Citrate	0.25 Gm.	4 grains
Ferri et Strychninæ Citras, Iron and Strychnine Citrate	0.125 Gm.	2 grains
Ferri Hydroxidum, Ferric Hydroxide		
Ferri Hydroxidum cum Magnesii Oxido, Ferric Hydroxide with Magnesium Oxide	arsenical antidote, 120. Cc.	4 fl. oz.
Ferri Hypophosphis, Ferric Hypophosphite	0.2 Gm.	3 grains
Ferri Phosphas Solubilis, Soluble Ferric Phosphate	0.25 Gm.	4 grains
Ferri Pyrophosphas Solubilis, Soluble Ferric Pyrophosphate	0.25 Gm.	4 grains
Ferri Sulphas, Ferrous Sulphate	0.2 Gm.	3 grains
Ferri Sulphas Exsiccatus, Exsiccated Ferrous Sulphate	0.125 Gm.	2 grains
Ferri Sulphas Granulatus, Granulated Ferrous Sulphate	0.2 Gm.	3 grains
Ferrum, Iron		
Ferrum Reductum, Reduced Iron	0.065 Gm.	1 grain
Ficus, Fig		
Fluidextractum Aconiti, Fluidextract of Aconite	0.05 Cc.	1 min.
Fluidextractum Apocyni, Fluidextract of Apocynum	1. Cc.	15 mins.
Fluidextractum Aromaticum, Aromatic Fluidextract	1. Cc.	15 mins.
Fluidextractum Aurantii Amari, Fluidextract of Bitter Orange Peel	1. Cc.	15 mins.
Fluidextractum Belladonnæ Radicis, Fluidextract of Belladonna Root	0.05 Cc.	1 min.
Fluidextractum Berberidis, Fluidextract of Berberis	2. Cc.	30 mins.
Fluidextractum Buchu, Fluidextract of Buchu	2. Cc.	30 mins.
Fluidextractum Calami, Fluidextract of Calamus	1. Cc.	15 mins.
Fluidextractum Calumbæ, Fluidextract of Calumba	2. Cc.	30 mins.
Fluidextractum Cannabis Indicæ, Fluidextract of Indian Cannabis	0.05 Cc.	1 min.
Fluidextractum Capsici, Fluidextract of Capsicum	0.05 Cc.	1 min.
Fluidextractum Chimaphilæ, Fluidextract of Chimaphila	2. Cc.	30 mins.
Fluidextractum Chiratæ, Fluidextract of Chirata	1. Cc.	15 mins.
Fluidextractum Cimicifugæ, Fluidextract of Cimicifuga	1. Cc.	15 mins.

	Dose	Dose
Fluidextractum Cinchonæ, Fluidextract of Cinchona	1. Cc.	15 mins.
Fluidextractum Cocæ, Fluidextract of Coca	2. Cc.	30 mins.
Fluidextractum Colchici Seminis, Fluidextract of Colchicum Seed	0.2 Cc.	3 mins.
Fluidextractum Conii, Fluidextract of Conium	0.2 Cc.	3 mins.
Fluidextractum Convallariæ, Fluidextract of Convallaria	0.5 Cc.	8 mins.
Fluidextractum Cubebæ, Fluidextract of Cubeb	1. Cc.	15 mins.
Fluidextractum Cypripedii, Fluidextract of Cypripedium	1. Cc.	15 mins.
Fluidextractum Digitalis, Fluidextract of Digitalis	0.05 Cc.	1 min.
Fluidextractum Ergotæ, Fluidextract of Ergot	2. Cc.	30 mins.
Fluidextractum Eriodictyi, Fluidextract of Eriodictyon	1. Cc.	15 mins.
Fluidextractum Eucalypti, Fluidextract of Eucalyptus	2. Cc.	30 mins.
Fluidextractum Euonymi, Fluidextract of Euonymus	0.5 Cc.	8 mins.
Fluidextractum Eupatorii, Fluidextract of Eupatorium	2. Cc.	30 mins.
Fluidextractum Frangulæ, Fluidextract of Frangula	1. Cc.	15 mins.
Fluidextractum Gelsemii, Fluidextract of Gelsemium	0.05 Cc.	1 min.
Fluidextractum Gentianæ, Fluidextract of Gentian	1. Cc.	15 mins.
Fluidextractum Geranii, Fluidextract of Geranium	1. Cc.	15 mins.
Fluidextractum Glycyrrhizæ, Fluidextract of Glycyrrhiza	2. Cc.	30 mins.
Fluidextractum Granati, Fluidextract of Pomegranate	2. Cc.	30 mins.
Fluidextractum Grindeliæ, Fluidextract of Grindelia	2. Cc.	30 mins.
Fluidextractum Guaranæ, Fluidextract of Guarana	2. Cc.	30 mins.
Fluidextractum Hamamelidis Foliorum, Fluidextract of Hamamelis Leaves	2. Cc.	30 mins.
Fluidextractum Hydrastis, Fluidextract of Hydrastis	2. Cc.	30 mins.
Fluidextractum Hyoscyami, Fluidextract of Hyoscyamus	0.2 Cc.	3 mins.
Fluidextractum Ipecacuanhæ, Fluidextract of Ipecac	emetic, 1. Cc.	15 mins.
	expectorant, 0.05 Cc.	1 min.
Fluidextractum Krameriæ, Fluidextract of Krameria	1. Cc.	15 mins.
Fluidextractum Lappæ, Fluidextract of Lappa	2. Cc.	30 mins.
Fluidextractum Leptandræ, Fluidextract of Leptandra	1. Cc.	15 mins.
Fluidextractum Lobeliæ, Fluidextract of Lobelia	0.5 Cc.	8 mins.
Fluidextractum Lupulini, Fluidextract of Lupulin	0.5 Cc.	8 mins.
Fluidextractum Matico, Fluidextract of Matico	4. Cc.	1 fl. dr.
Fluidextractum Mezerei, Fluidextract of Mezereum		
Fluidextractum Nucis Vomicæ, Fluidextract of Nux Vomica	0.05 Cc.	1 min.
Fluidextractum Pareiræ, Fluidextract of Pareira	2. Cc.	30 mins.
Fluidextractum Phytolaccæ, Fluidextract of Phytolacca	emetic, 1. Cc.	15 mins.
	alterative, 0.1 Cc.	1½ mins.
Fluidextractum Pilocarpi, Fluidextract of Pilocarpus	2. Cc.	30 mins.
Fluidextractum Podophylli, Fluidextract of Podophyllum	0.5 Cc.	8 mins.
Fluidextractum Pruni Virginianæ, Fluidextract of Wild Cherry	2. Cc.	30 mins.
Fluidextractum Quassiæ, Fluidextract of Quassia	0.5 Cc.	8 mins.
Fluidextractum Quercus, Fluidextract of Quercus	1. Cc.	15 mins.
Fluidextractum Quillajæ, Fluidextract of Quillaja	0.2 Cc.	3 mins.
Fluidextractum Rhamni Purshianæ, Fluidextract of Cascara Sagrada	1. Cc.	15 mins.
Fluidextractum Rhamni Purshianæ Aromaticum, Aromatic Fluidextract of Cascara Sagrada	1. Cc.	15 mins.
Fluidextractum Rhei, Fluidextract of Rhubarb	1. Cc.	15 mins.
Fluidextractum Rhois Glabræ, Fluidextract of Rhus Glabra	1. Cc.	15 mins.

	Dose	Dose
Fluidextractum Rosæ, Fluidextract of Rose	2. Cc.	30 mins.
Fluidextractum Rubi, Fluidextract of Rubus	1. Cc.	15 mins.
Fluidextractum Sabinæ, Fluidextract of Savin	0.3 Cc.	5 mins.
Fluidextractum Sanguinariæ, Fluidextract of Sanguinaria	0.1 Cc.	1½ mins.
Fluidextractum Sarsaparillæ Compositum, Compound Fluidextract of Sarsaparilla	2. Cc.	30 mins.
Fluidextractum Sarsaparillæ, Fluidextract of Sarsaparilla	2. Cc.	30 mins.
Fluidextractum Scillæ, Fluidextract of Squill	0.1 Cc.	1½ mins.
Fluidextractum Scopolæ, Fluidextract of Scopola	0.05 Cc.	1 min.
Fluidextractum Scutellariæ, Fluidextract of Scutellaria	1. Cc.	15 mins.
Fluidextractum Senegæ, Fluidextract of Senega	1. Cc.	15 mins.
Fluidextractum Sennæ, Fluidextract of Senna	2. Cc.	30 mins.
Fluidextractum Serpentariæ, Fluidextract of Serpentaria	1. Cc.	15 mins.
Fluidextractum Spigeliæ, Fluidextract of Spigelia	4. Cc.	1 fl. dr.
Fluidextractum Staphisagriæ, Fluidextract of Staphisagria	0.05 Cc.	1 min.
Fluidextractum Stillingiæ, Fluidextract of Stillingia	2. Cc.	30 mins.
Fluidextractum Stramonii, Fluidextract of Stramonium	0.05 Cc.	1 min.
Fluidextractum Sumbul, Fluidextract of Sumbul	2. Cc.	30 mins.
Fluidextractum Taraxaci, Fluidextract of Taraxacum	8. Cc.	2 fl. dr.
Fluidextractum Tritici, Fluidextract of Triticum	8. Cc.	2 fl. dr.
Fluidextractum Uvæ Ursi, Fluidextract of Uva Ursi	2. Cc.	30 mins.
Fluidextractum Valerianæ, Fluidextract of Valerian	2. Cc.	30 mins.
Fluidextractum Veratri, Fluidextract of Veratrum	0.1 Cc.	1½ mins.
Fluidextractum Viburni Opuli, Fluidextract of Viburnum Opulus	2. Cc.	30 mins.
Fluidextractum Viburni Prunifolii, Fluidextract of Virburnum Prunifolium	2. Cc.	30 mins.
Fluidextractum Xanthoxyli, Fluidextract of Xanthoxylum	2. Cc.	30 mins.
Fluidextractum Zingiberis, Fluidextract of Ginger	1. Cc.	15 mins.
Fœniculum, Fennel	1. Gm.	15 grains
Frangula, Frangula	1. Gm.	15 grains
Galla, Nutgall	0.5 Gm.	7½ grains
Gambir, Gambir	1. Gm.	15 grains
Gelatinum, Gelatin		
Gelatinum Glycerinatum, Glycerinated Gelatin		
Gelsemium, Gelsemium	0.065 Gm.	1 grain
Gentiana, Gentian	1. Gm.	15 grains
Geranium, Geranium	1. Gm.	15 grains
Glandulæ Suprarenales Siccæ, Desiccated Suprarenal Glands	0.25 Gm.	4 grains
Glandulæ Thyroideæ Siccæ, Desiccated Thyroid Glands	0.25 Gm.	4 grains
Glycerinum, Glycerin, Glycerol	4. Cc.	1 fl. dr.
Glyceritum Acidi Tannici, Glycerite of Tannic Acid	2. Cc.	30 mins.
Glyceritum Amyli, Glycerite of Starch		
Glyceritum Boroglycerini, Glycerite of Boroglycerin		
Glyceritum Ferri, Quininæ et Strychninæ Phosphatum, Glycerite of the Phosphates of Iron, Quinine, and Strychnine	1. Cc.	15 mins.
Glyceritum Hydrastis, Glycerite of Hydrastis	2. Cc.	30 mins.
Glyceritum Phenolis, Glycerite of Phenol	0.3 Cc.	5 mins.
Glycyrrhiza, Glycyrrhiza, Licorice Root	2. Gm.	30 grains
Glycyrrhizinum Ammoniatum, Ammoniated Glycyrrhizin	0.25 Gm.	4 grains
Gossypii Cortex, Cotton Root Bark	2. Gm.	30 grains
Gossypium Purificatum, Purified Cotton		
Granatum, Pomegranate	2. Gm.	30 grains
Grindelia, Grindelia	2. Gm.	30 grains
Guaiacol, Guaiacol	0.5 Cc.	8 mins.

	Dose	Dose
Guaiacolis Carbonas, Guaiacol Carbonate	1. Gm.	15 grains
Guaiacum, Guaiac	1. Gm.	15 grains
Guarana, Guarana	2. Gm.	30 grains
Hæmatoxylon, Hematoxylon		
Hamamelidis Cortex, Hamamelis Bark	2. Gm.	30 grains
Hamamelidis Folia, Hamamelis Leaves	2. Gm.	30 grains
Hedeoma, Hedeoma	8. Gm.	120 grains
Hexamethylenamina, Hexamethylenamine	0.25 Gm.	4 grains
Homatropinæ Hydrobromidum, Homatropine Hydrobromide	0.0005 Gm.	$\frac{1}{128}$ grain
Humulus, Hops	2. Gm.	30 grains
Hydrargyri Chloridum Corrosivum, Corrosive Mercuric Chloride	0.003 Gm.	$\frac{1}{20}$ grain
Hydrargyri Chloridum Mite, Mild Mercurous Chloride	laxative, 0.125 Gm. alterative, 0.065 Gm.	2 grains 1 grain
Hydrargyri Iodidum Flavum, Yellow Mercurous Iodide	0.01 Gm.	$\frac{1}{6}$ grain
Hydrargyri Iodidum Rubrum, Red Mercuric Iodide	0.003 Gm.	$\frac{1}{20}$ grain
Hydrargyri Oxidum Flavum, Yellow Mercuric Oxide		
Hydrargyri Oxidum Rubrum, Red Mercuric Oxide		
Hydrargyrum, Mercury		
Hydrargyrum Ammoniatum, Ammoniated Mercury		
Hydrargyrum cum Creta, Mercury with Chalk	0.25 Gm.	4 grains
Hydrastina, Hydrastine	0.01 Gm.	$\frac{1}{6}$ grain
Hydrastininæ Hydrochloridum, Hydrastinine Hydrochloride	0.03 Gm.	$\frac{1}{2}$ grain
Hydrastis, Hydrastis	2. Gm.	30 grains
Hyoscinæ Hydrobromidum, Hyoscine Hydrobromide	0.0005 Gm.	$\frac{1}{128}$ grain
Hyoscyaminæ Hydrobromidum, Hyoscyamine Hydrobromide	0.0005 Gm.	$\frac{1}{128}$ grain
Hyoscyaminæ Sulphas, Hyoscyamine Sulphate	0.0005 Gm.	$\frac{1}{128}$ grain
Hyoscyamus, Hyoscyamus	0.25 Gm.	4 grains
Infusa, Infusions		
Infusum Digitalis, Infusion of Digitalis	8. Cc.	2 fl. dr.
Infusum Pruni Virginianæ, Infusion of Wild Cherry	60. Cc.	2 fl. oz.
Infusum Sennæ Compositum, Compound Infusion of Senna	120. Cc.	4 fl. oz.
Iodoformum, Iodoform	0.25 Gm.	4 grains
Iodolum, Iodol	0.25 Gm.	4 grains
Iodum, Iodine	0.005 Gm.	$\frac{1}{10}$ grain
Ipecacuanha, Ipecac	expectorant, 0.065 Gm. emetic, 1. Gm.	1 grain 15 grains
Jalapa, Jalap	1. Gm.	15 grains
Kaolinum, Kaolin		
Kino, Kino	0.5 Gm.	$7\frac{1}{2}$ grains
Krameria, Krameria	1. Gm.	15 grains
Lactucarium, Lactucarium	1. Gm.	15 grains
Lappa, Lappa	2. Gm.	30 grains
Leptandra, Leptandra	1. Gm.	15 grains
Limonis Cortex, Lemon Peel		
Limonis Succus, Lemon Juice	30. Cc.	1 fl. oz.
Linimentum Ammoniæ, Ammonia Liniment		
Linimentum Belladonnæ, Belladonna Liniment		
Linimentum Calcis, Lime Liniment		
Linimentum Camphoræ, Camphor Liniment		
Linimentum Chloroformi, Chloroform Liniment		
Linimentum Saponis Mollis, Liniment of Soft Soap		
Linimentum Saponis, Soap Liniment		
Linimentum Terebinthinæ, Turpentine Liniment		
Linum, Linseed, Flaxseed		
Liquor Acidi Arsenosi, Solution of Arsenous Acid	0.2 Cc.	3 mins.

	Dose	Dose
Liquor Ammonii Acetatis, Solution of Ammonium Acetate	16. Cc.	4 fl. dr.
Liquor Antisepticus, Antiseptic Solution	4. Cc.	1 fl. dr.
Liquor Arseni et Hydrargyri Iodidi, Solution of Arsenous and Mercuric Iodides	0.1 Cc.	1½ mins.
Liquor Calcis, Lime Water, Solution of Calcium Hydroxide	16. Cc.	4 fl. dr.
Liquor Chlori Compositus, Compound Solution of Chlorine, Chlorine Water	4. Cc.	1 fl. dr.
Liquor Cresolis Compositus, Compound Solution of Cresol	0.1 Cc.	1½ mins.
Liquor Ferri Chloridi, Solution of Ferric Chloride	16. Cc.	4 fl. dr.
Liquor Ferri et Ammonii Acetatis, Solution of Iron and Ammonium Acetate	0.2 Cc.	3 mins.
Liquor Ferri Subsulphatis, Solution of Ferric Subsulphate		
Liquor Ferri Tersulphatis, Solution of Ferric Sulphate		
Liquor Formaldehydi, Solution of Formaldehyde		
Liquor Hydrargyri Nitratis, Solution of Mercuric Nitrate	0.2 Cc.	3 mins.
Liquor Iodi Compositus, Compound Solution of Iodine	360. Cc.	12 fl. oz.
Liquor Magnesii Citratis, Solution of Magnesium Citrate		
Liquor Plumbi Subacetatis Dilutus, Diluted Solution of Lead Subacetate		
Liquor Plumbi Subacetatis, Solution of Lead Subacetate		
Liquor Potassii Arsenitis, Solution of Potassium Arsenite	0.2 Cc.	3 mins.
Liquor Potassii Citratis, Solution of Potassium Citrate	16. Cc.	4 fl. dr.
Liquor Potassii Hydroxidi, Solution of Potassium Hydroxide	1. Cc.	15 mins.
Liquor Sodæ Chlorinatæ, Solution of Chlorinated Soda	1. Cc.	15 mins.
Liquor Sodii Arsenatis, Solution of Sodium Arsenate	0.2 Cc.	3 mins.
Liquor Sodii Hydroxidi, Solution of Sodium Hydroxide	1. Cc.	15 mins.
Liquor Sodii Phosphatis Compositus, Compound Solution of Sodium Phosphate	8. Cc.	2 fl. dr.
Liquor Zinci Chloridi, Solution of Zinc Chloride		
Lithii Benzoas, Lithium Benzoate	1. Gm.	15 grains
Lithii Bromidum, Lithium Bromide	1. Gm.	15 grains
Lithii Carbonas, Lithium Carbonate	0.5 Gm.	7½ grains
Lithii Citras Effervescens, Effervescent Lithium Citrate	8. Gm.	120 grains
Lithii Citras, Lithium Citrate	0.5 Gm.	7½ grains
Lithii Salicylas, Lithium Salicylate	1. Gm.	15 grains
Lobelia, Lobelia	0.5 Gm.	7½ grains
Lupulinum, Lupulin	0.5 Gm.	7½ grains
Lycopodium, Lycopodium		
Magnesii Carbonas, Magnesium Carbonate	3. Gm.	45 grains
Magnesii Oxidum, Magnesium Oxide, Magnesia	2. Gm.	30 grains
Magnesii Oxidum Ponderosum, Heavy Magnesium Oxide, Heavy Magnesia	2. Gm.	30 grains
Magnesii Sulphas Effervescens, Effervescent Magnesium Sulphate	16. Gm.	240 grains
Magnesii Sulphas, Magnesium Sulphate	16. Gm.	240 grains
Maltum, Malt		
Mangani Dioxidum Præcipitatum, Precipitated Manganese Dioxide	0.25 Gm.	4 grains
Mangani Hypophosphis, Manganese Hypophosphite	0.2 Gm.	3 grains
Mangani Sulphas, Manganese Sulphate	0.25 Gm.	4 grains
Manna, Manna	16. Gm.	240 grains
Marrubium, Marrubium	2. Gm.	30 grains
Massa Ferri Carbonatis, Mass of Ferrous Carbonate	0.25 Gm.	4 grains

	Dose	Dose
Massa Hydrargyri, Mass of Mercury	0.25 Gm.	4 grains
Mastiche, Mastic	2. Gm.	30 grains
Matico, Matico	4. Gm.	60 grains
Matricaria, Matricaria	16. Gm.	240 grains
Mel, Honey	4. Cc.	1 fl. dr.
Mel Depuratum, Clarified Honey	4. Cc.	1 fl. dr.
Mel Rosæ, Honey of Rose	4. Cc.	1 fl. dr.
Mentha Piperita, Peppermint	4. Gm.	60 grains
Mentha Viridis, Spearmint	4. Gm.	60 grains
Menthol, Menthol	0.065 Gm.	1 grain
Methylis Salicylas, Methyl Salicylate	1. Cc.	15 mins.
Methylthioninæ Hydrochloridum, Methylthionine Hydrochloride, Methylene Blue	0.25 Gm.	4 grains
Mezereum, Mezereum	0.5 Gm.	7½ grains
Mistura Cretæ, Chalk Mixture	16. Cc.	4 fl. dr.
Mistura Ferri Composita, Compound Iron Mixture	16. Cc.	4 fl. dr.
Mistura Glycyrrhizæ Composita, Compound Mixture of Glycyrrhiza	8. Cc.	2 fl. dr.
Mistura Rhei et Sodæ, Mixture of Rhubarb and Soda	4. Cc.	1 fl. dr.
Morphina, Morphine	0.01 Gm.	⅙ grain
Morphinæ Acetas, Morphine Acetate	0.015 Gm.	¼ grain
Morphinæ Hydrochloridum, Morphine Hydrochloride	0.015 Gm.	¼ grain
Morphinæ Sulphas, Morphine Sulphate	0.015 Gm.	¼ grain
Moschus, Musk	0.25 Gm.	4 grains
Mucilago Acaciæ, Mucilage of Acacia	16. Cc.	4 fl. dr.
Mucilago Sassafras Medullæ, Mucilage of Sassafras Pith	16. Cc.	4 fl. dr.
Mucilago Tragacanthæ, Mucilage of Tragacanth	16. Cc.	4 fl. dr.
Mucilago Ulmi, Mucilage of Elm	16. Cc.	4 fl. dr.
Myristica, Myristica	0.5 Gm.	7½ grains
Myrrha, Myrrh	0.5 Gm.	7½ grains
Naphthalenum, Naphthalene	0.125 Gm.	2 grains
Nux Vomica, Nux Vomica	0.065 Gm.	1 grain
Oleatum Atropinæ, Oleate of Atropine		
Oleatum Cocainæ, Oleate of Cocaine		
Oleatum Hydrargyri, Oleate of Mercury		
Oleatum Quininæ, Oleate of Quinine		
Oleatum Veratrinæ, Oleate of Veratrine		
Oleoresina Aspidii, Oleoresin of Aspidium	2. Gm.	30 grains
Oleoresina Capsici, Oleoresin of Capsicum	0.03 Gm.	½ grain
Oleoresina Cubebæ, Oleoresin of Cubeb	0.5 Gm.	7½ grains
Oleoresina Lupulini, Oleoresin of Lupulin	0.2 Gm.	3 grains
Oleoresina Piperis, Oleoresin of Pepper	0.03 Gm.	½ grain
Oleoresina Zingiberis, Oleoresin of Ginger	0.03 Gm.	½ grain
Oleum Adipis, Lard Oil		
Oleum Æthereum, Ethereal Oil		
Oleum Amygdalæ Amaræ, Oil of Bitter Almond	0.03 Cc.	½ min.
Oleum Amygdalæ Expressum, Expressed Oil of Almond	30. Cc.	1 fl. oz.
Oleum Anisi, Oil of Anise	0.2 Cc.	3 mins.
Oleum Aurantii Corticis, Oil of Orange Peel	0.2 Cc.	3 mins.
Oleum Betulæ, Oil of Betula	1. Cc.	15 mins.
Oleum Cadinum, Oil of Cade		
Oleum Cajuputi, Oil of Cajuput	0.5 Cc.	8 mins.
Oleum Cari, Oil of Caraway	0.2 Cc.	3 mins.
Oleum Caryophylli, Oil of Cloves	0.2 Cc.	3 mins.
Oleum Chenopodii, Oil of Chenopodium	0.2 Cc.	3 mins.
Oleum Cinnamomi, Oil of Cinnamon, Oil of Cassia	0.05 Cc.	1 min.
Oleum Copaibæ, Oil of Copaiba	0.5 Cc.	8 mins.
Oleum Coriandri, Oil of Coriander	0.2 Cc.	3 mins.
Oleum Cubebæ, Oil of Cubeb	0.5 Cc.	8 mins.
Oleum Erigerontis, Oil of Erigeron	1. Cc.	15 mins.
Oleum Eucalypti, Oil of Eucalyptus	0.5 Cc.	8 mins.
Oleum Fœniculi, Oil of Fennel	0.2 Cc.	3 mins.

	Dose	Dose
Oleum Gaultheriæ, Oil of Gaultheria	1. Cc.	15 mins.
Oleum Gossypii Seminis, Cottonseed Oil	16. Cc.	4 fl. dr.
Oleum Hedeomæ, Oil of Hedeoma	0.2 Cc.	3 mins.
Oleum Juniperi, Oil of Juniper	0.2 Cc.	3 mins.
Oleum Lavandulæ Florum, Oil of Lavender Flowers	0.2 Cc.	3 mins.
Oleum Limonis, Oil of Lemon	0.2 Cc.	3 mins.
Oleum Lini, Linseed Oil	30. Cc.	1 fl. oz.
Oleum Menthæ Piperitæ, Oil of Peppermint	0.2 Cc.	3 mins.
Oleum Menthæ Viridis, Oil of Spearmint	0.2 Cc.	3 mins.
Oleum Morrhuæ, Cod-liver Oil	16. Cc.	4 fl. dr.
Oleum Myristicæ, Oil of Myristica	0.2 Cc.	3 mins.
Oleum Olivæ, Olive Oil	30. Cc.	1 fl. oz.
Oleum Picis Liquidæ, Oil of Tar	0.2 Cc.	3 mins.
Oleum Pimentæ, Oil of Pimenta	0.2 Cc.	3 mins.
Oleum Ricini, Castor Oil	16. Cc.	4 fl. dr.
Oleum Rosæ, Oil of Rose		
Oleum Rosmarini, Oil of Rosemary	0.2 Cc.	3 mins.
Oleum Sabinæ, Oil of Savin	0.05 Cc.	1 min.
Oleum Santali, Oil of Santal	0.5 Cc.	8 mins.
Oleum Sassafras, Oil of Sassafras	0.2 Cc.	3 mins.
Oleum Sinapis Volatile, Volatile Oil of Mustard	0.008 Cc.	$\frac{1}{8}$ min.
Oleum Terebinthinæ, Oil of Turpentine		
Oleum Terebinthinæ Rectificatum, Rectified Oil of Turpentine	1. Cc.	15 mins.
Oleum Theobromatis, Oil of Theobroma		
Oleum Thymi, Oil of Thyme	0.2 Cc.	3 mins.
Oleum Tiglii, Croton Oil	0.05 Cc.	1 min.
Opii Pulvis, Powdered Opium	0.065 Gm.	1 grain
Opium, Opium	0.1 Gm.	$1\frac{1}{2}$ grains
Opium Deodoratum, Deodorized Opium	0.065 Gm.	1 grain
Opium Granulatum, Granulated Opium	0.065 Gm.	1 grain
Pancreatinum, Pancreatin	0.5 Gm.	$7\frac{1}{2}$ grains
Paraffinum, Paraffin		
Paraldehydum, Paraldehyde	2. Cc.	30 mins.
Pareira, Pareira	2. Gm.	30 grains
Pelletierinæ Tannas, Pelletierine Tannate	0.25 Gm.	4 grains
Pepo, Pepo	30. Gm.	1 ounce
Pepsinum, Pepsin	0.25 Gm.	4 grains
Petrolatum, Petrolatum		
Petrolatum Album, White Petrolatum		
Petrolatum Liquidum, Liquid Petrolatum		
Phenol, Phenol	0.065 Gm.	1 grain
Phenol Liquefactum, Liquefied Phenol	0.05 Cc.	1 min.
Phenylis Salicylas, Phenyl Salicylate	0.5 Gm.	$7\frac{1}{2}$ grains
Phosphorus, Phosphorus	0.0005 Gm.	$\frac{1}{120}$ grain
Physostigma, Physostigma	0.1 Gm.	$1\frac{1}{2}$ grains
Physostigminæ Salicylas, Physostigmine Salicylate	0.001 Gm.	$\frac{1}{64}$ grain
Physostigminæ Sulphas, Physostigmine Sulphate	0.001 Gm.	$\frac{1}{64}$ grain
Phytolacca, Phytolacca	emetic, 1. Gm. alterative, 0.125 Gm.	15 grains 2 grains
Pilocarpinæ Hydrochloridum, Pilocarpine Hydrochloride	0.01 Gm.	$\frac{1}{6}$ grain
Pilocarpinæ Nitras, Pilocarpine Nitrate	0.01 Gm.	$\frac{1}{6}$ grain
Pilocarpus, Pilocarpus	2. Gm.	30 grains
Pilulæ Aloes, Pills of Aloes	....	2 pills
Pilulæ Aloes et Ferri, Pills of Aloes and Iron	....	2 pills
Pilulæ Aloes et Mastiches, Pills of Aloes and Mastic	....	2 pills
Pilulæ Aloes et Myrrhæ, Pills of Aloes and Myrrh	....	2 pills
Pilulæ Asafœtidæ, Pills of Asafetida	....	2 pills
Pilulæ Catharticæ Compositæ, Compound Cathartic Pills	....	2 pills

	Dose	Dose
Pilulæ Catharticæ Vegetabiles, Vegetable Cathartic Pills	....	2 pills
Pilulæ Ferri Carbonatis, Pills of Ferrous Carbonate	....	2 pills
Pilulæ Ferri Iodidi, Pills of Ferrous Iodide	....	2 pills
Pilulæ Laxativæ Compositæ, Compound Laxative Pills	....	2 pills
Pilulæ Opii, Pills of Opium	....	1 pill
Pilulæ Phosphori, Pills of Phosphorus	....	1 pill
Pilulæ Podophylli, Belladonnæ et Capsici, Pills of Podophyllum, Belladonna, and Capsicum	....	1 pill
Pilulæ Rhei Compositæ, Compound Pills of Rhubarb	....	2 pills
Pimenta, Pimenta	1. Gm.	15 grains
Piper, Pepper	0.5 Gm.	7½ grains
Piperina, Piperine	0.2 Gm.	3 grains
Pix Liquida, Tar	0.5 Gm.	7½ grains
Plumbi Acetas, Lead Acetate	0.065 Gm.	1 grain
Plumbi Iodidum, Lead Iodide		
Plumbi Nitras, Lead Nitrate		
Plumbi Oxidum, Lead Oxide		
Podophyllum, Podophyllum	0.5 Gm.	7½ grains
Potassii Acetas, Potassium Acetate	2. Gm.	30 grains
Potassii Bicarbonas, Potassium Bicarbonate	2. Gm.	30 grains
Potassii Bitartras, Potassium Bitartrate	{ diuretic, 2. Gm.	30 grains
Potassii Bromidum, Potassium Bromide	1. Gm.	15 grains
Potassii Carbonas, Potassium Carbonate	1. Gm.	15 grains
Potassii Chloras, Potassium Chlorate	0.25 Gm.	4 grains
Potassii Citras Effervescens, Effervescent Potassium Citrate	4. Gm.	60 grains
Potassii Citras, Potassium Citrate	1. Gm.	15 grains
Potassii Cyanidum, Potassium Cyanide	0.01 Gm.	$\frac{1}{6}$ grain
Potassii Dichromas, Potassium Dichromate	0.01 Gm.	$\frac{1}{6}$ grain
Potassii et Sodii Tartras, Potassium and Sodium Tartrate	8. Gm.	120 grains
Potassii Ferrocyanidum, Potassium Ferrocyanide	0.5 Gm.	7½ grains
Potassii Hydroxidum, Potassium Hydroxide		
Potassii Hypophosphis, Potassium Hypophosphite	0.5 Gm.	7½ grains
Potassii Iodidum, Potassium Iodide	0.5 Gm.	7½ grains
Potassii Nitras, Potassium Nitrate	0.5 Gm.	7½ grains
Potassii Permanganas, Potassium Permanganate	0.065 Gm.	1 grain
Potassii Sulphas, Potassium Sulphate	2. Gm.	30 grains
Prunum, Prune		
Prunus Virginiana, Wild Cherry	2. Gm.	30 grains
Pulvis Acetanilidi Compositus, Compound Acetanilide Powder	0.5 Gm.	7½ grains
Pulvis Aromaticus, Aromatic Powder	1. Gm.	15 grains
Pulvis Cretæ Compositus, Compound Chalk Powder	2. Gm.	30 grains
Pulvis Effervescens Compositus, Compound Effervescing Powder	1 set of two powders	
Pulvis Glycyrrhizæ Compositus, Compound Powder of Glycyrrhiza	4. Gm.	60 grains
Pulvis Ipecacuanhæ et Opii, Powder of Ipecac and Opium	0.5 Gm.	7½ grains
Pulvis Jalapæ Compositus, Compound Powder of Jalap	2. Gm.	30 grains
Pulvis Morphinæ Compositus, Compound Powder of Morphine	0.5 Gm.	7½ grains
Pulvis Rhei Compositus, Compound Powder of Rhubarb	2. Gm.	30 grains
Pyrethrum, Pyrethrum	2. Gm.	30 grains
Pyrogallol, Pyrogallol		
Pyroxylinum, Pyroxylin		
Quassia, Quassia	0.5 Gm.	7½ grains

	Dose	Dose
Quercus, White Oak	1. Gm.	15 grains
Quillaja, Quillaja		
Quinina, Quinine	0.25 Gm.	4 grains
Quininæ Bisulphas, Quinine Bisulphate	0.25 Gm.	4 grains
Quininæ Hydrobromidum, Quinine Hydrobromide	0.25 Gm.	4 grains
Quininæ Hydrochloridum, Quinine Hydrochloride	0.25 Gm.	4 grains
Quininæ Salicylas, Quinine Salicylate	0.25 Gm.	4 grains
Quininæ Sulphas, Quinine Sulphate	0.25 Gm.	4 grains
Resina, Rosin	0.25 Gm.	4 grains
Resina Jalapæ, Resin of Jalap	0.125 Gm.	2 grains
Resina Podophylli, Resin of Podophyllum	purgative, 0.015 Gm.	¼ grain
	laxative, 0.005 Gm.	$\frac{1}{10}$ grain
Resina Scammonii, Resin of Scammony	0.2 Gm.	3 grains
Resorcinol, Resorcinol	0.125 Gm.	2 grains
Rhamnus Purshiana, Cascara Sagrada	1. Gm.	15 grains
Rheum, Rhubarb	1. Gm.	15 grains
Rhus Glabra, Rhus Glabra	1. Gm.	15 grains
Rosa Gallica, Red Rose		
Rubus, Rubus	1. Gm.	15 grains
Sabal, Sabal	1. Gm.	15 grains
Sabina, Savin	0.5 Gm.	7½ grains
Saccharum, Sugar		
Saccharum Lactis, Sugar of Milk		
Safrolum, Safrol	0.3 Cc.	5 mins.
Salicinum, Salicin	1. Gm.	15 grains
Salvia, Salvia	2. Gm.	30 grains
Sanguinaria, Sanguinaria	0.125 Gm.	2 grains
Santalum Rubrum, Red Saunders		
Santonica, Santonica		
Santoninum, Santonin	0.065 Gm.	1 grain
Sapo, Soap		
Sapo Mollis, Soft Soap		
Sarsaparilla, Sarsaparilla	2. Gm.	30 grains
Sassafras, Sassafras	8. Gm.	120 grains
Sassafras Medulla, Sassafras Pith		
Scammonium, Scammony	0.25 Gm.	4 grains
Scilla, Squill	0.125 Gm.	2 grains
Scoparius, Scoparius	1. Gm.	15 grains
Scopola, Scopola	0.045 Gm.	¾ grain
Scopolaminæ Hydrobromidum, Scopolamine Hydrobromide	0.0005 Gm.	$\frac{1}{1\,2\,3}$ grain
Scutellaria, Scutellaria	1. Gm.	15 grains
Senega, Senega	1. Gm.	15 grains
Senna, Senna	4. Gm.	60 grains
Serpentaria, Serpentaria	1. Gm.	15 grains
Serum Antidiphthericum, Antidiphtheric Serum, Diphtheria Antitoxin	average dose,	3000 units
	immunizing dose for well persons,	500 units
Sevum Præparatum, Prepared Suet		
Sinapis Alba, White Mustard	emetic, 8. Gm.	120 grains
Sinapis Nigra, Black Mustard	emetic, 8. Gm.	120 grains
Sodii Acetas, Sodium Acetate	1. Gm.	15 grains
Sodii Arsenas, Sodium Arsenate	0.005 Gm.	$\frac{1}{10}$ grain
Sodii Arsenas Exsiccatus, Exsiccated Sodium Arsenate	0.003 Gm.	$\frac{1}{2\,0}$ grain
Sodii Benzoas, Sodium Benzoate	1. Gm.	15 grains
Sodii Bicarbonas, Sodium Bicarbonate	1. Gm.	15 grains
Sodii Bisulphis, Sodium Bisulphite	0.5 Gm.	7½ grains
Sodii Boras, Sodium Borate	0.5 Gm.	7½ grains
Sodii Bromidum, Sodium Bromide	1. Gm.	15 grains
Sodii Carbonas Monohydratus, Monohydrated Sodium Carbonate	0.25 Gm.	4 grains

	Dose	Dose
Sodii Chloras, Sodium Chlorate	0.25 Gm.	4 grains
Sodii Chloridum, Sodium Chloride	emetic, 16. Gm.	240 grains
Sodii Citras, Sodium Citrate	1. Gm.	15 grains
Sodii Hydroxidum, Sodium Hydroxide		
Sodii Hypophosphis, Sodium Hypophosphite	1. Gm.	15 grains
Sodii Iodidum, Sodium Iodide	0.5 Gm.	7½ grains
Sodii Nitras, Sodium Nitrate	1. Gm.	15 grains
Sodii Nitris, Sodium Nitrite	0.065 Gm.	1 grain
Sodii Phenolsulphonas, Sodium Phenolsulphonate	0.25 Gm.	4 grains
Sodii Phosphas, Sodium Phosphate	2. Gm.	30 grains
Sodii Phosphas Effervescens, Effervescent Sodium Phosphate	8. Gm.	120 grains
Sodii Phosphas Exsiccatus, Exsiccated Sodium Phosphate	1. Gm.	15 grains
Sodii Pyrophosphas, Sodium Pyrophosphate	2. Gm.	30 grains
Sodii Salicylas, Sodium Salicylate	1. Gm.	15 grains
Sodii Sulphas, Sodium Sulphate	16 Gm.	240 grains
Sodii Sulphis, Sodium Sulphite	1. Gm.	15 grains
Sodii Thiosulphas, Sodium Thiosulphate	1. Gm.	15 grains
Sparteinæ Sulphas, Sparteine Sulphate	0.01 Gm.	⅙ grain
Spigelia, Spigelia	4. Gm.	60 grains
Spiritus Ætheris, Spirit of Ether	4. Cc.	1 fl. dr.
Spiritus Ætheris Compositus, Compound Spirit of Ether	4. Cc.	1 fl. dr.
Spiritus Ætheris Nitrosi, Spirit of Nitrous Ether	2. Cc.	30 mins.
Spiritus Ammoniæ, Spirit of Ammonia	1. Cc.	15 mins.
Spiritus Ammoniæ Aromaticus, Aromatic Spirit of Ammonia	2. Cc.	30 mins.
Spiritus Amygdalæ Amaræ, Spirit of Bitter Almond	0.5 Cc.	8 mins.
Spiritus Anisi, Spirit of Anise	4. Cc.	1 fl. dr.
Spiritus Aurantii Compositus, Compound Spirit of Orange	1. Cc.	15 mins.
Spiritus Camphoræ, Spirit of Camphor	2. Cc.	30 mins.
Spiritus Chloroformi, Spirit of Chloroform	2. Cc.	30 mins.
Spiritus Cinnamomi, Spirit of Cinnamon		
Spiritus Frumenti, Whisky	2. Cc.	30 mins.
Spiritus Gaultheriæ, Spirit of Gaultheria		
Spiritus Glycerylis Nitratis, Spirit of Glyceryl Trinitrate, Spirit of Nitroglycerin	0.05 Cc.	1 min.
Spiritus Juniperi, Spirit of Juniper	2. Cc.	30 mins.
Spiritus Juniperi Compositus, Compound Spirit of Juniper	8. Cc.	2 fl. dr.
Spiritus Lavandulæ, Spirit of Lavender	2. Cc.	30 mins.
Spiritus Menthæ Piperitæ, Spirit of Peppermint	2. Cc.	30 mins.
Spiritus Menthæ Viridis, Spirit of Spearmint	2. Cc.	30 mins.
Spiritus Vini Gallici, Brandy		
Staphisagria, Staphisagria	0.065 Gm.	1 grain
Stillingia, Stillingia	2. Gm.	30 grains
Stramonium, Stramonium	0.065 Gm.	1 grain
Strontii Bromidum, Strontium Bromide	1. Gm.	15 grains
Strontii Iodidum, Strontium Iodide	0.5 Gm.	7½ grains
Strontii Salicylas, Strontium Salicylate	1. Gm.	15 grains
Strophanthinum, Strophanthin	0.0003 Gm.	$\frac{1}{200}$ grain
Strophanthus, Strophanthus	0.065 Gm.	1 grain
Strychnina, Strychnine	0.001 Gm.	$\frac{1}{60}$ grain
Strychninæ Nitras, Strychnine Nitrate	0.001 Gm.	$\frac{1}{60}$ grain
Strychninæ Sulphas, Strychnine Sulphate	0.001 Gm.	$\frac{1}{60}$ grain
Styrax, Storax	1. Gm.	15 grains
Sulphonethylmethanum, Sulphonethylmethane	1. Gm.	15 grains
Sulphonmethanum, Sulphonmethane	1. Gm.	15 grains
Sulphur Lotum, Washed Sulphur	4. Gm.	60 grains
Sulphur Præcipitatum, Precipitated Sulphur	4. Gm.	60 grains
Sulphur Sublimatum, Sublimed Sulphur	4. Gm.	60 grains

	Dose	Dose
Sulphuris Iodidum, Sulphur Iodide		
Sumbul, Sumbul	2. Gm.	30 grains
Suppositoria, Suppositories		
Suppositoria Glycerini, Suppositories of Glycerin		
Syrupus, Syrup		
Syrupus Acaciæ, Syrup of Acacia		
Syrupus Acidi Citrici, Syrup of Citric Acid		
Syrupus Acidi Hydriodici, Syrup of Hydriodic Acid	4. Cc.	1 fl. dr.
Syrupus Amygdalæ, Syrup of Almond	4. Cc.	1 fl. dr.
Syrupus Aurantii, Syrup of Orange		
Syrupus Aurantii Florum, Syrup of Orange Flowers		
Syrupus Calcii Lactophosphatis, Syrup of Calcium Lactophosphate	8. Cc.	2 fl. dr.
Syrupus Calcis, Syrup of Lime, Syrup of Calcium Hydroxide	2. Cc.	30 mins.
Syrupus Ferri Iodidi, Syrup of Ferrous Iodide	1. Cc.	15 mins.
Syrupus Ferri, Quininæ et Strychninæ Phosphatum, Syrup of the Phosphates of Iron, Quinine, and Strychnine	4. Cc.	1 fl. dr.
Syrupus Hypophosphitum, Syrup of Hypophosphites	8. Cc.	2 fl. dr.
Syrupus Hypophosphitum Compositus, Compound Syrup of Hypophosphites	8. Cc.	2 fl. dr.
Syrupus Ipecacuanhæ, Syrup of Ipecac	{ expectorant, 1 Cc.	15 mins.
	{ emetic, 15. Cc.	4 fl. dr.
Syrupus Krameriæ, Syrup of Krameria	4. Cc.	1 fl. dr.
Syrupus Lactucarii, Syrup of Lactucarium	8. Cc.	2 fl. dr.
Syrupus Picis Liquidæ, Syrup of Tar	4. Cc.	1 fl. dr.
Syrupus Pruni Virginianæ, Syrup of Wild Cherry	4. Cc.	1 fl. dr.
Syrupus Rhei, Syrup of Rhubarb	8. Cc.	2 fl. dr.
Syrupus Rhei Aromaticus, Aromatic Syrup of Rhubarb	8. Cc.	2 fl. dr.
Syrupus Rosæ, Syrup of Rose		
Syrupus Rubi, Syrup of Rubus	4. Cc.	1 fl. dr.
Syrupus Sarsaparillæ Compositus, Compound Syrup of Sarsaparilla	16. Cc.	4 fl. dr.
Syrupus Scillæ, Syrup of Squill	2. Cc.	30 mins.
Syrupus Scillæ Compositus, Compound Syrup of Squill	2. Cc.	30 mins.
Syrupus Senegæ, Syrup of Senega	4. Cc.	1 fl. dr.
Syrupus Sennæ, Syrup of Senna	4. Cc.	1 fl. dr.
Syrupus Tolutanus, Syrup of Tolu	16. Cc.	4 fl. dr.
Syrupus Zingiberis, Syrup of Ginger	16. Cc.	4 fl. dr.
Talcum, Talc		
Talcum Purificatum, Purified Talc		
Tamarindus, Tamarind	16. Gm.	240 grains
Taraxacum, Taraxacum	8. Gm.	120 grains
Terebenum, Terebene	0.5 Cc.	8 mins.
Terebinthina, Turpentine		
Terebinthina Canadensis, Canada Turpentine		
Terpini Hydras, Terpine Hydrate	0.125 Gm.	2 grains
Thymol, Thymol	0.125 Gm.	2 grains
Thymolis Iodidum, Thymol Iodide		
Tinctura Aconiti, Tincture of Aconite	0.6 Cc.	10 mins.
Tinctura Aloes, Tincture of Aloes	2. Cc.	30 mins.
Tinctura Aloes et Myrrhæ, Tincture of Aloes and Myrrh	2. Cc.	30 mins.
Tinctura Arnicæ, Tincture of Arnica	1. Cc.	15 mins.
Tinctura Asafœtidæ, Tincture of Asafetida	1. Cc.	15 mins.
Tinctura Aurantii Amari, Tincture of Bitter Orange Peel	4. Cc.	1 fl. dr.
Tinctura Aurantii Dulcis, Tincture of Sweet Orange Peel	4. Cc.	1 fl. dr.
Tinctura Belladonnæ Foliorum, Tincture of Belladonna Leaves	0.5 Cc.	8 mins.

	Dose	Dose
Tinctura Benzoini, Tincture of Benzoin	1 Cc.	15 mins.
Tinctura Benzoini Composita, Compound Tincture of Benzoin	2. Cc.	30 mins.
Tinctura Calendulæ, Tincture of Calendula		
Tinctura Calumbæ, Tincture of Calumba	4 Cc.	1 fl dr.
Tinctura Cannabis Indicæ, Tincture of Indian Cannabis	0.6 Cc.	10 mins.
Tinctura Cantharidis, Tincture of Cantharides	0.3 Cc.	5 mins.
Tinctura Capsici, Tincture of Capsicum	0.5 Cc.	8 mins.
Tinctura Cardamomi, Tincture of Cardamom	4. Cc.	1 fl. dr.
Tinctura Cardamomi Composita, Compound Tincture of Cardamom	4. Cc.	1 fl. dr.
Tinctura Cimicifugæ, Tincture of Cimicifuga	4. Cc.	1 fl. dr.
Tinctura Cinchonæ, Tincture of Cinchona	4. Cc.	1 fl. dr.
Tinctura Cinchonæ Composita, Compound Tincture of Cinchona	4. Cc.	1 fl. dr.
Tinctura Cinnamomi, Tincture of Cinnamon	2. Cc.	30 mins.
Tinctura Colchici Seminis, Tincture of Colchicum Seed	2. Cc.	30 mins.
Tinctura Digitalis, Tincture of Digitalis	1. Cc.	15 mins.
Tinctura Ferri Chloridi, Tincture of Ferric Chloride	0.5 Cc.	8 mins.
Tinctura Gallæ, Tincture of Nutgall	4. Cc.	1 fl. dr.
Tinctura Gambir Composita, Compound Tincture of Gambir	4. Cc.	1 fl. dr.
Tinctura Gelsemii, Tincture of Gelsemium	0.5 Cc.	8 mins.
Tinctura Gentianæ Composita, Compound Tincture of Gentian	4. Cc.	1 fl. dr.
Tinctura Guaiaci, Tincture of Guaiac	4. Cc.	1 fl. dr.
Tinctura Guaiaci Ammoniata, Ammoniated Tincture of Guaiac	2. Cc.	30 mins.
Tinctura Hydrastis, Tincture of Hydrastis	4. Cc.	1 fl. dr.
Tinctura Hyoscyami, Tincture of Hyoscyamus	2. Cc.	30 mins.
Tinctura Iodi, Tincture of Iodine	0.1 Cc.	1½ mins.
Tinctura Ipecacuanhæ et Opii, Tincture of Ipecac and Opium	0.5 Cc.	8 mins.
Tinctura Kino, Tincture of Kino	4. Cc.	1 fl. dr.
Tinctura Krameriæ, Tincture of Krameria	4. Cc.	1 fl. dr.
Tinctura Lactucarii, Tincture of Lactucarium	2. Cc.	30 mins.
Tinctura Lavandulæ Composita, Compound Tincture of Lavender	2. Cc.	30 mins.
Tinctura Limonis Corticis, Tincture of Lemon Peel		
Tinctura Lobeliæ, Tincture of Lobelia	expectorant, 1. Cc.	15 mins.
	emetic, 4. Cc.	1 fl. dr.
Tinctura Moschi, Tincture of Musk	4. Cc.	1 fl. dr.
Tinctura Myrrhæ, Tincture of Myrrh	1. Cc.	15 mins.
Tinctura Nucis Vomicæ, Tincture of Nux Vomica	0.6 Cc.	10 mins.
Tinctura Opii, Tincture of Opium, Laudanum	0.5 Cc.	8 mins.
Tinctura Opii Camphorata, Camphorated Tincture of Opium, Paregoric	8. Cc.	2 fl. dr.
Tinctura Opii Deodorati, Tincture of Deodorized Opium	0.5 Cc.	8 mins.
Tinctura Physostigmatis, Tincture of Physostigma	1. Cc.	15 mins.
Tinctura Pyrethri, Tincture of Pyrethrum		
Tinctura Quassiæ, Tincture of Quassia	2. Cc.	30 mins.
Tinctura Quillajæ, Tincture of Quillaja		
Tinctura Rhei, Tincture of Rhubarb	4. Cc.	1 fl. dr.
Tinctura Rhei Aromatica, Aromatic Tincture of Rhubarb	2. Cc.	30 mins.
Tinctura Sanguinariæ, Tincture of Sanguinaria	1. Cc.	15 mins.
Tinctura Scillæ, Tincture of Squill	1. Cc.	15 mins.
Tinctura Serpentariæ, Tincture of Serpentaria	4. Cc.	1 fl. dr.
Tinctura Stramonii, Tincture of Stramonium	0.5 Cc.	8 mins.

	Dose	Dose
Tinctura Strophanthi, Tincture of Strophanthus	0.5 Cc.	8 mins.
Tinctura Tolutana, Tincture of Tolu	2. Cc.	30 mins.
Tinctura Valerianæ, Tincture of Valerian	4. Cc.	1 fl. dr.
Tinctura Valerianæ Ammoniata, Ammoniated Tincture of Valerian	2. Cc.	30 mins.
Tinctura Vanillæ, Tincture of Vanilla		
Tinctura Veratri, Tincture of Veratrum	1. Cc.	15 mins.
Tinctura Zingiberis, Tincture of Ginger	2. Cc.	30 mins.
Tincturæ Herbarum Recentium, Tinctures of Fresh Herbs		
Tragacantha, Tragacanth		
Triticum, Triticum	8. Gm.	120 grains
Triturationes, Triturations		
Trituratio Elaterini, Trituration of Elaterin	0.03 Gm.	$\frac{1}{2}$ grain
Trochisci Acidi Tannici, Troches of Tannic Acid		
Trochisci Ammonii Chloridi, Troches of Ammonium Chloride		
Trochisci Cubebæ, Troches of Cubeb		
Trochisci Gambir, Troches of Gambir		
Trochisci Glycyrrhizæ et Opii, Troches of Glycyrrhiza and Opium		
Trochisci Krameriæ, Troches of Krameria		
Trochisci Potassii Chloratis, Troches of Potassium Chlorate		
Trochisci Santonini, Troches of Santonin		
Trochisci Sodii Bicarbonatis, Troches of Sodium Bicarbonate		
Ulmus, Elm		
Unguentum, Ointment		
Unguentum Acidi Borici, Ointment of Boric Acid		
Unguentum Acidi Tannici, Ointment of Tannic Acid		
Unguentum Aquæ Rosæ, Ointment of Rose Water		
Unguentum Belladonnæ, Belladonna Ointment		
Unguentum Chrysarobini, Chrysarobin Ointment		
Unguentum Diachylon, Diachylon Ointment		
Unguentum Gallæ, Nutgall Ointment		
Unguentum Hydrargyri, Mercurial Ointment		
Unguentum Hydrargyri Ammoniati, Ointment of Ammoniated Mercury		
Unguentum Hydrargyri Dilutum, Blue Ointment		
Unguentum Hydrargyri Nitratis, Ointment of Mercuric Nitrate		
Unguentum Hydrargyri Oxidi Flavi, Ointment of Yellow Mercuric Oxide		
Unguentum Hydrargyri Oxidi Rubri, Ointment of Red Mercuric Oxide		
Unguentum Iodi, Iodine Ointment		
Unguentum Iodoformi, Iodoform Ointment		
Unguentum Phenolis, Ointment of Phenol		
Unguentum Picis Liquidæ, Tar Ointment		
Unguentum Potassii Iodidi, Ointment of Potassium Iodide		
Unguentum Stramonii, Stramonium Ointment		
Unguentum Sulphuris, Sulphur Ointment		
Unguentum Veratrinæ, Veratrine Ointment		
Unguentum Zinci Oxidi, Ointment of Zinc Oxide		
Unguentum Zinci Stearatis, Ointment of Zinc Stearate		
Uva Ursi, Uva Ursi	2. Gm.	30 grains
Valeriana, Valerian	2. Gm.	30 grains
Vanilla, Vanilla	1. Gm.	15 grains
Vanillinum, Vanillin	0.03 Gm.	$\frac{1}{2}$ grain
Veratrina, Veratrine	0.002 Gm.	$\frac{1}{30}$ grain
Veratrum, Veratrum	0.125 Gm.	2 grains

	Dose	Dose
Viburnum Opulus, Viburnum Opulus	2. Gm.	30 grains
Viburnum Prunifolium, Viburnum Prunifolium	2. Gm.	30 grains
Vinum Album, White Wine		
Vinum Antimonii, Wine of Antimony	1. Cc.	15 mins.
Vinum Cocæ, Wine of Coca	16. Cc.	4 fl. dr.
Vinum Colchici Seminis, Wine of Colchicum Seed	2. Cc.	30 mins.
Vinum Ergotæ, Wine of Ergot	8. Cc.	2 fl. dr.
Vinum Ferri, Wine of Iron	8. Cc.	2 fl. dr.
Vinum Ferri Amarum, Bitter Wine of Iron	8. Cc.	2 fl. dr.
Vinum Ipecacuanhæ, Wine of Ipecac	1. Cc.	15 mins.
Vinum Opii, Wine of Opium	0.5 Cc.	8 mins.
Vinum Rubrum, Red Wine		
Xanthoxylum, Xanthoxylum	2. Gm.	30 grains
Zea, Zea		
Zinci Acetas, Zinc Acetate	0.125 Gm.	2 grains
Zinci Bromidum, Zinc Bromide	0.125 Gm.	2 grains
Zinci Carbonas Præcipitatus, Precipitated Zinc Carbonate		
Zinci Chloridum, Zinc Chloride		
Zinci Iodidum, Zinc Iodide	0.065 Gm.	1 grain
Zinci Oxidum, Zinc Oxide	0.25 Gm.	4 grains
Zinci Phenolsulphonas, Zinc Phenolsulphonate	0.125 Gm.	2 grains
Zinci Stearas, Zinc Stearate		
Zinci Sulphas, Zinc Sulphate	emetic, 1. Gm.	15 grains
Zinci Valeras, Zinc Valerate	0.125 Gm.	2 grains
Zincum, Zinc		
Zingiber, Ginger	1. Gm.	15 grains

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